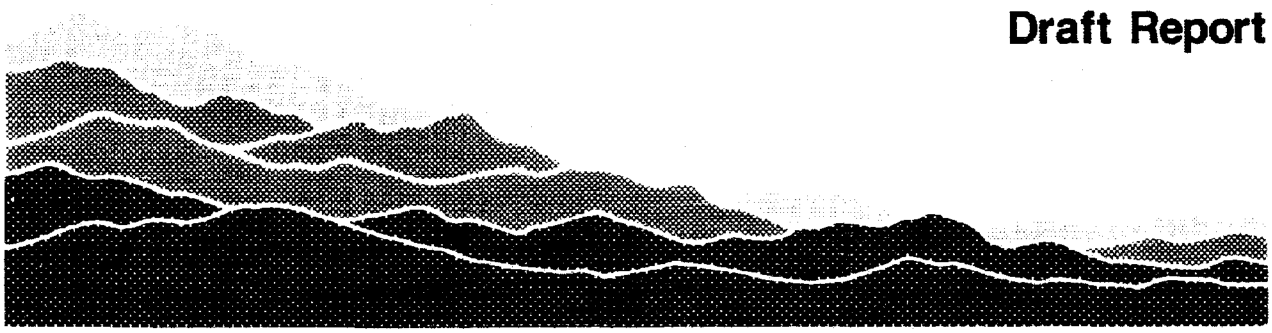
Draft Report



Soil Erosion Model For Pago Pago Harbor
Tutuila, American Samoa

American Samoa Coastal Program

Coastal Zone Management Office &
Environmental Quality Commission
American Samoa Government

March 31, 1986
K/J/C 5318

Kennedy/Jenks/Chilton

Kennedy/Jenks/Chilton
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5624.A44 S65 1986 c.1

31 March 1986

Economic Development Planning & Tourism Office
American Samoa Government
Pago Pago, American Samoa 96799

Attention: Mr. Henry Sesapasara

Subject: Soil Erosion Model for
Pago Pago Harbor
K/J/C 5318

Gentlemen:

We are pleased to transmit 5 copies of the draft report in compliance with the American Samoa Government Contract dated April 16, 1985. We look forward to obtaining your comments in thirty days for incorporation into the final report.

Per your instructions, a copy of this draft has been express mailed to Judy Kelly, the CZM program specialist, in Washington, D.C.

Very truly yours,

KENNEDY/JENKS/CHILTON

Melvin K. Koizumi

Melvin K. Koizumi
Manager of Environmental Services

MKK:kem
Attachments

Draft Report

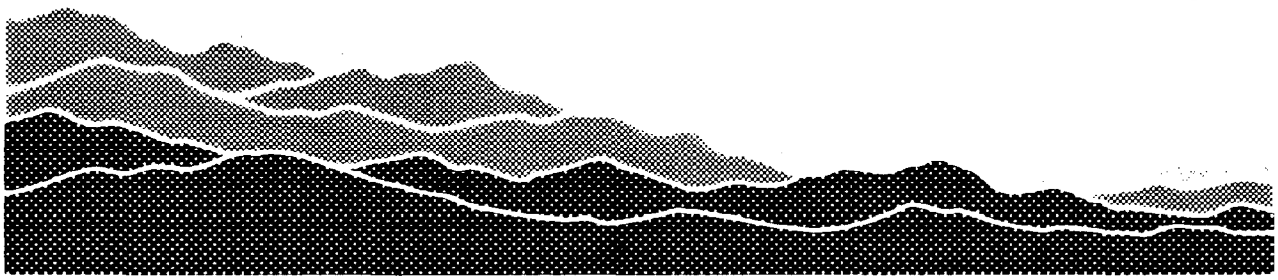

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

Background and Authorization

The water quality of Pago Pago Harbor has been of concern to the American Samoa Government, the tuna packers in American Samoa, and the U. S. Environmental Protection Agency. The degradation of Pago Pago Harbor waters is caused by two main sources of pollution: point sources and nonpoint sources of pollution.

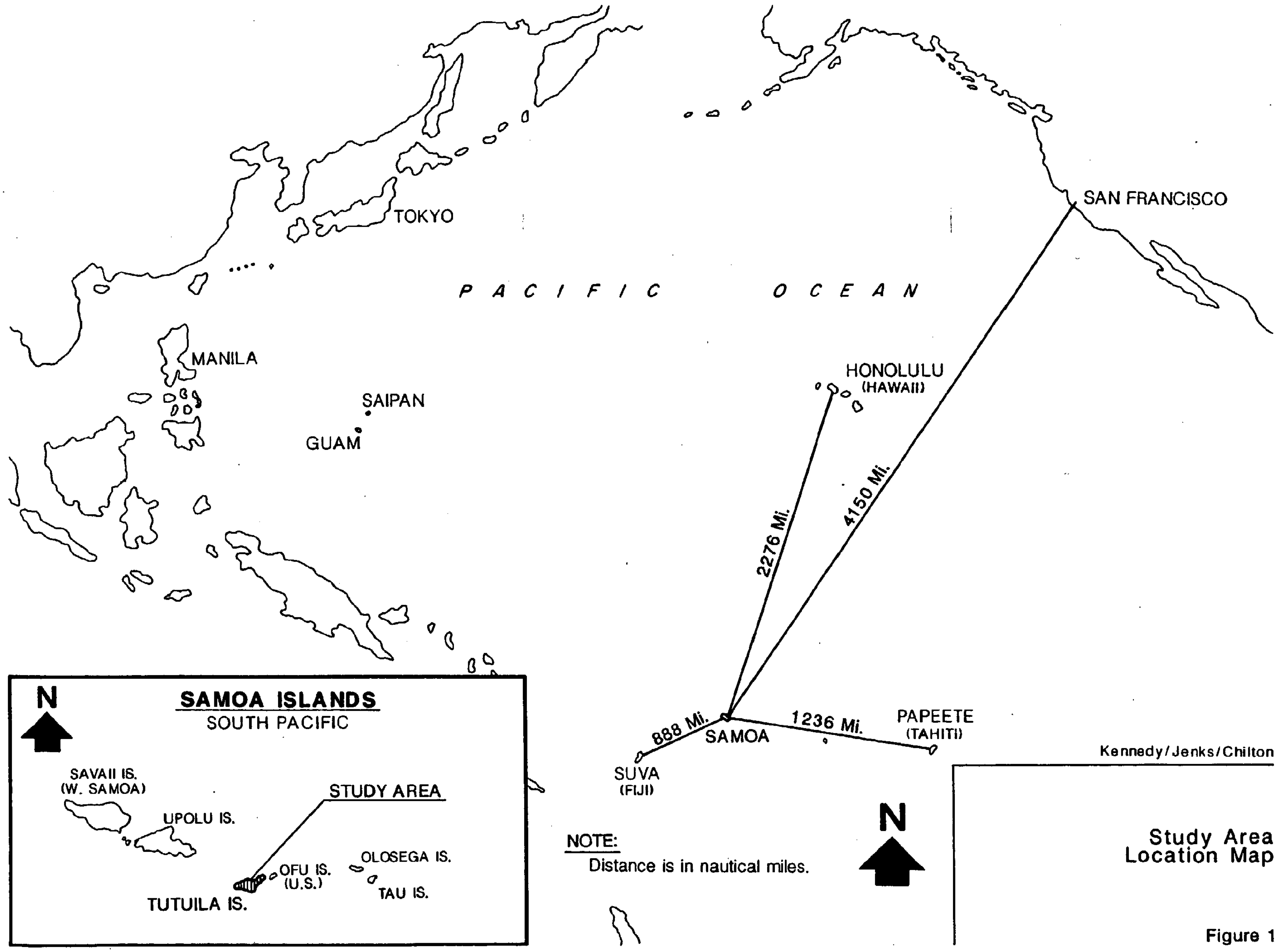
Resources have been applied by these agencies toward minimizing the effects of point source pollution (end of pipe discharges) through treatment and/or diversion of wastewater from the Harbor. The Economic Development Planning & Tourism Office and Environmental Quality Commission of the American Samoa Government focused on the evaluation of nonpoint source pollution to obtain a more complete understanding of water pollution in Pago Pago Harbor.

Kennedy/Jenks/Chilton was authorized jointly by the Environmental Quality Commission and the Economic Development Planning & Tourism Office to perform a computer based nonpoint source evaluation of soil erosion discharges into Pago Pago Harbor.

Objectives and Scope of Work

The purpose of the study is to estimate the changes in nonpoint source pollutant loading into Pago Pago Harbor caused by land development in the tributary area. The Pago Pago Harbor hydrologic basin was identified by the Economic Development Planning & Tourism Office and the Environmental Quality Commission to assess the magnitude and importance of the aggregated nonpoint source contributions to harbor water quality for a 25 year development period. The study applies the STORM computer model to the Pago Pago Harbor drainage basin to estimate present and future nonpoint source pollutant loadings to the Harbor and to thus provide a portion of the data for informed future decisions on land use. This study documents information contained in the Coastal Zone Management Atlas, U. S. Soil Conservation Service Soils Study, National Weather Service data, U. S. Geological Survey stream flow data, and field monitoring to examine the most probable cause of nonpoint source harbor pollution: sediment transport and deposition.

The scope of work for this study contained in the contract dated April 16, 1985 consists of obtaining the required written and field information to complete the calibration and production runs of the STORM model and reporting the results in a report describing land uses contained in the scenarios, methodology, the computer model, the input data and parameters, and predicted pollutant loads with changes in land use.



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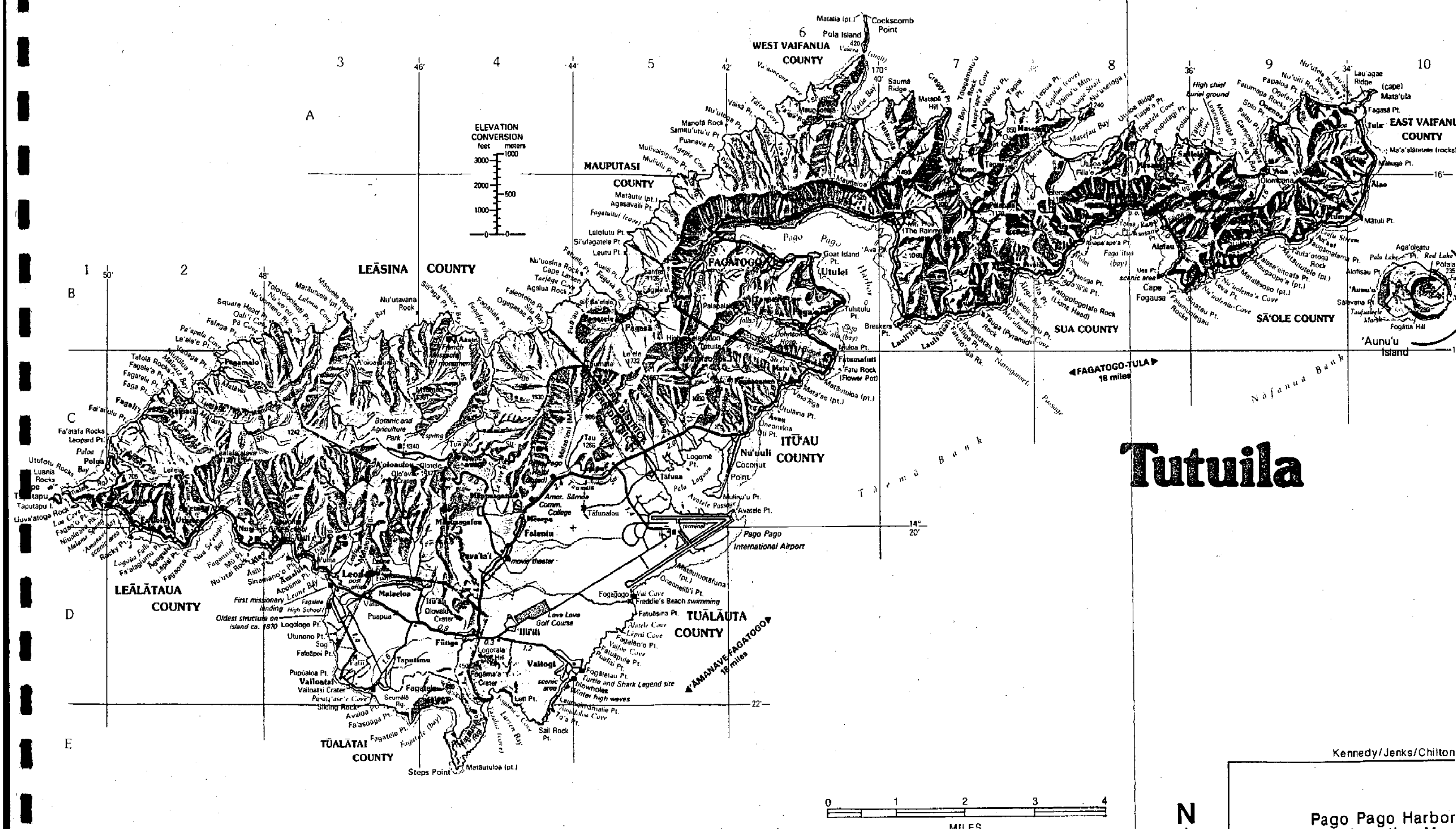
Study Area Location Map

Figure 1



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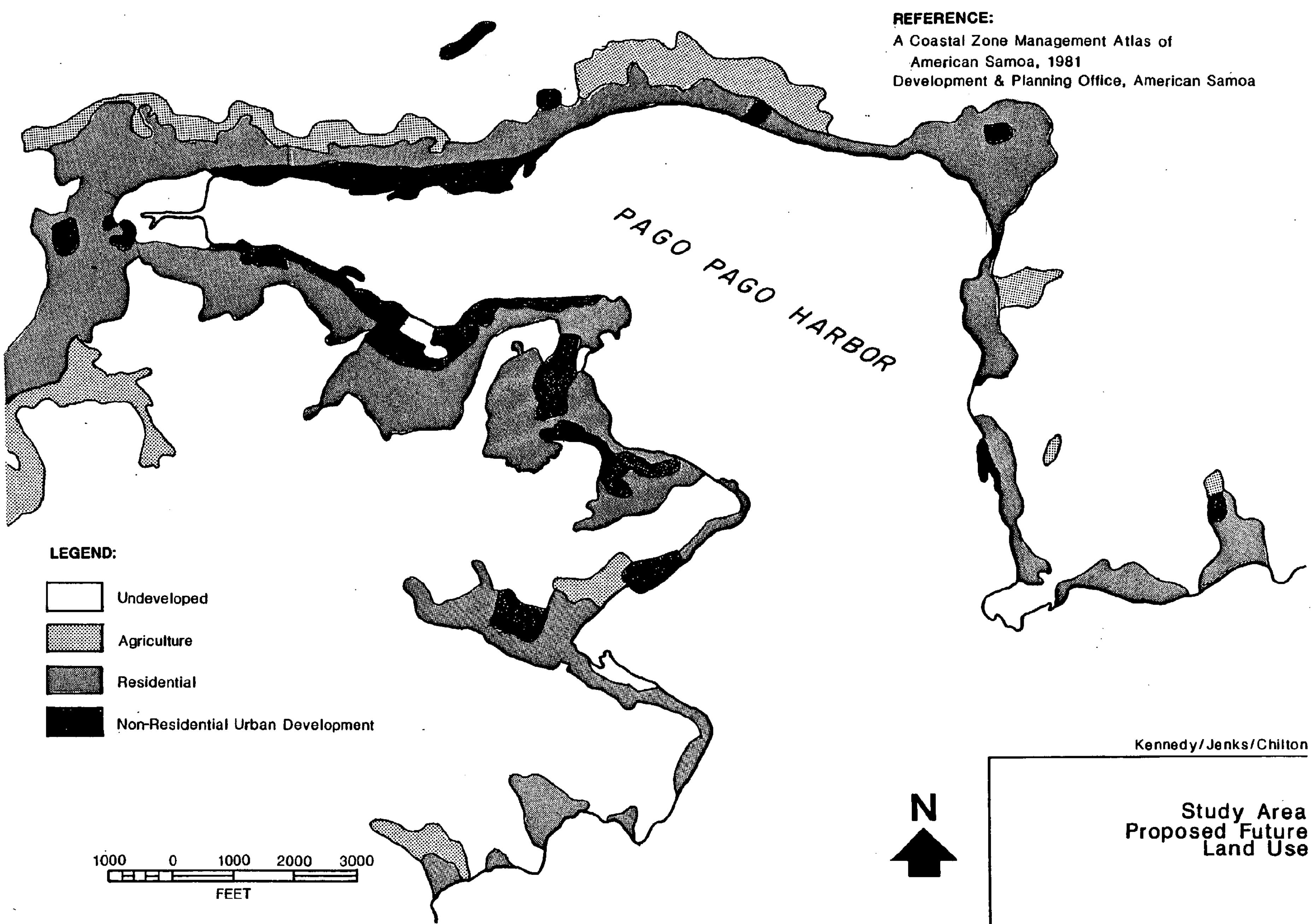
Pago Pago Harbor
Location Map

Figure 2

REFERENCE:
The University Press of Hawaii, 1980



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Study Area
Proposed Future
Land Use

Figure 3

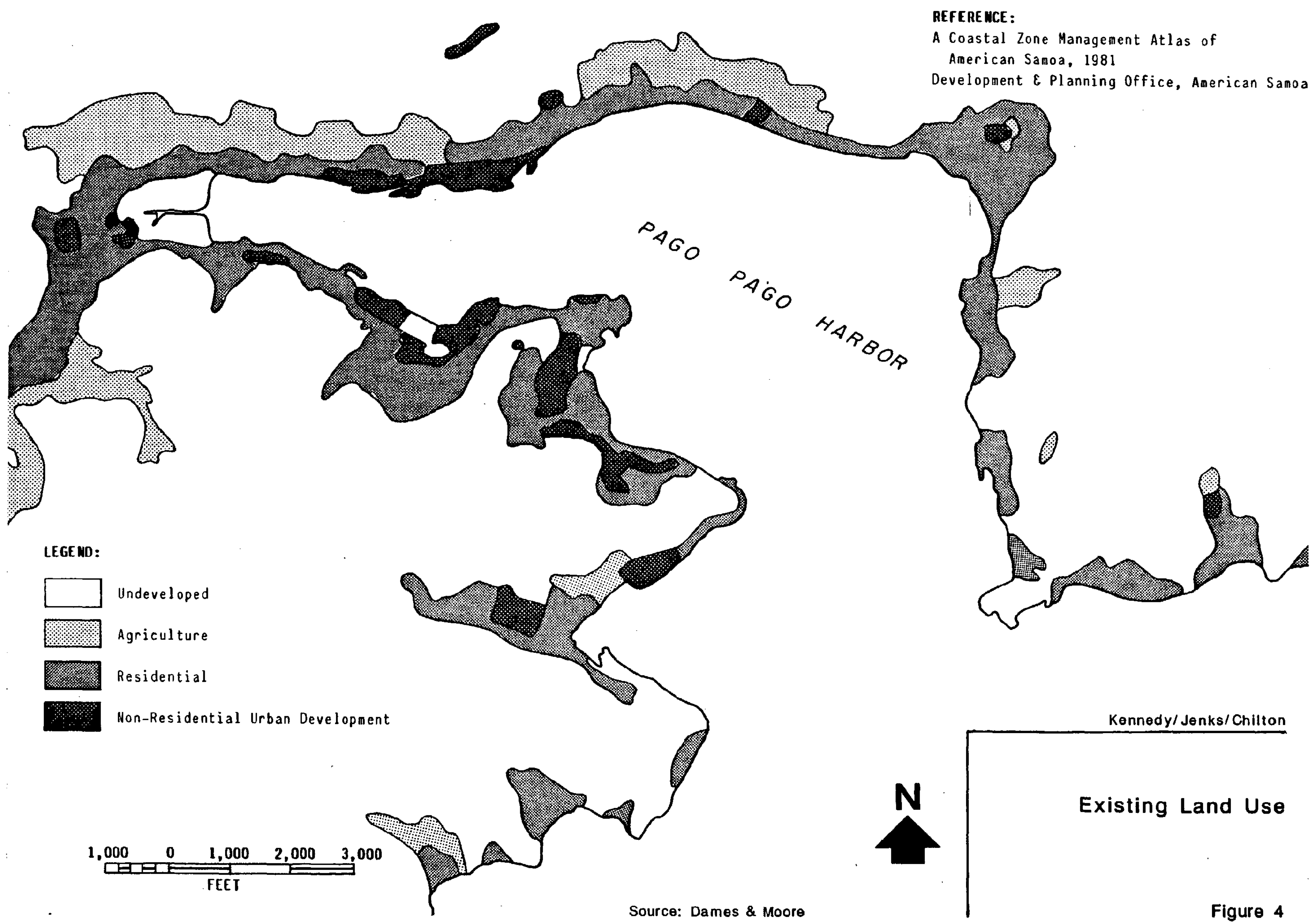
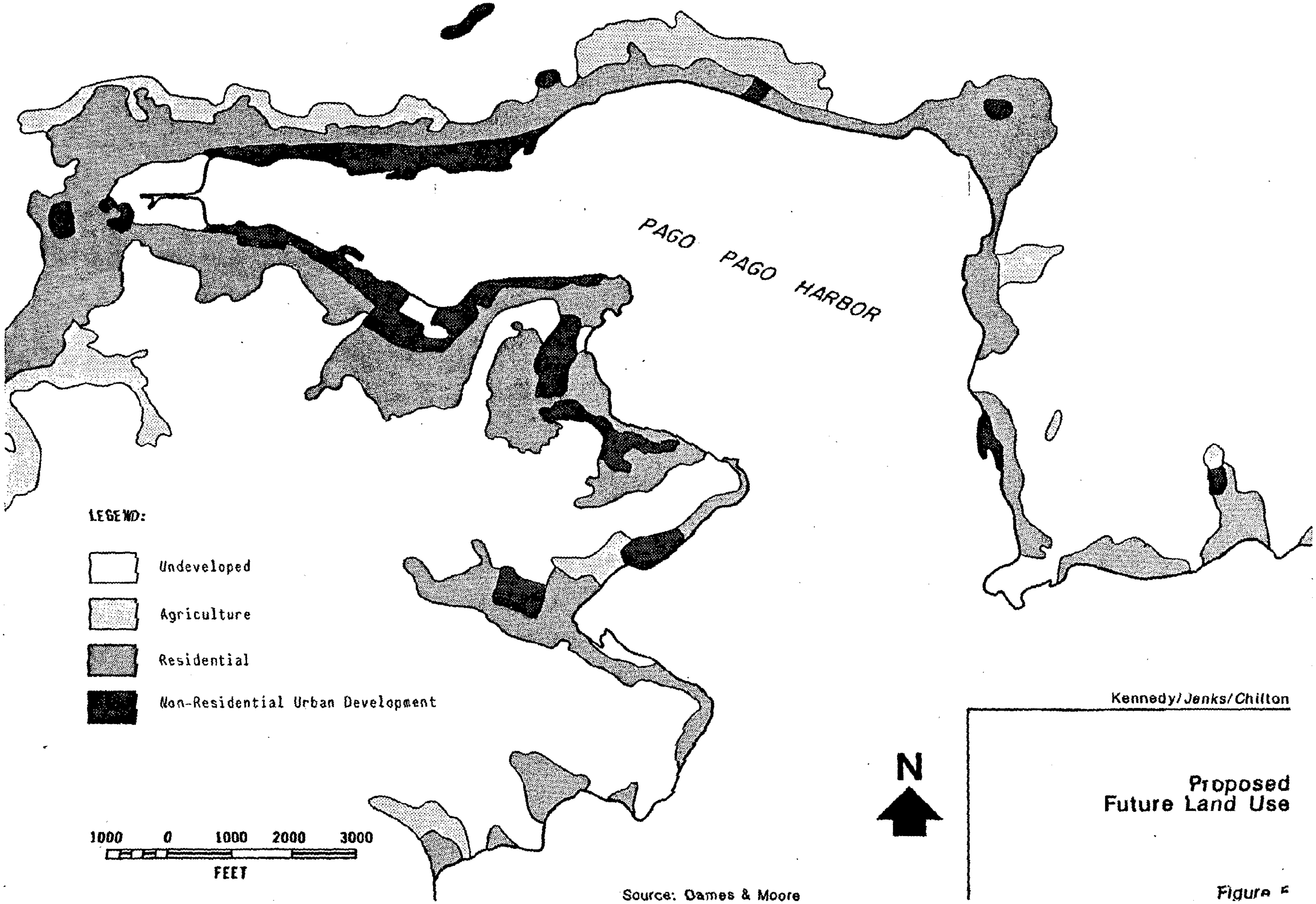

REFERENCE:
A Coastal Zone Management Atlas of
American Samoa, 1981
Development & Planning Office, American Samoa
PAGO PAGO HARBOR
LEGEND:
Undeveloped
Agriculture
Residential
Non-Residential Urban Development
1,000 0 1,000 2,000 3,000
FEET
N
Source: Dames & Moore
Kennedy/Jenks/Chilton
Existing Land Use

Figure 4

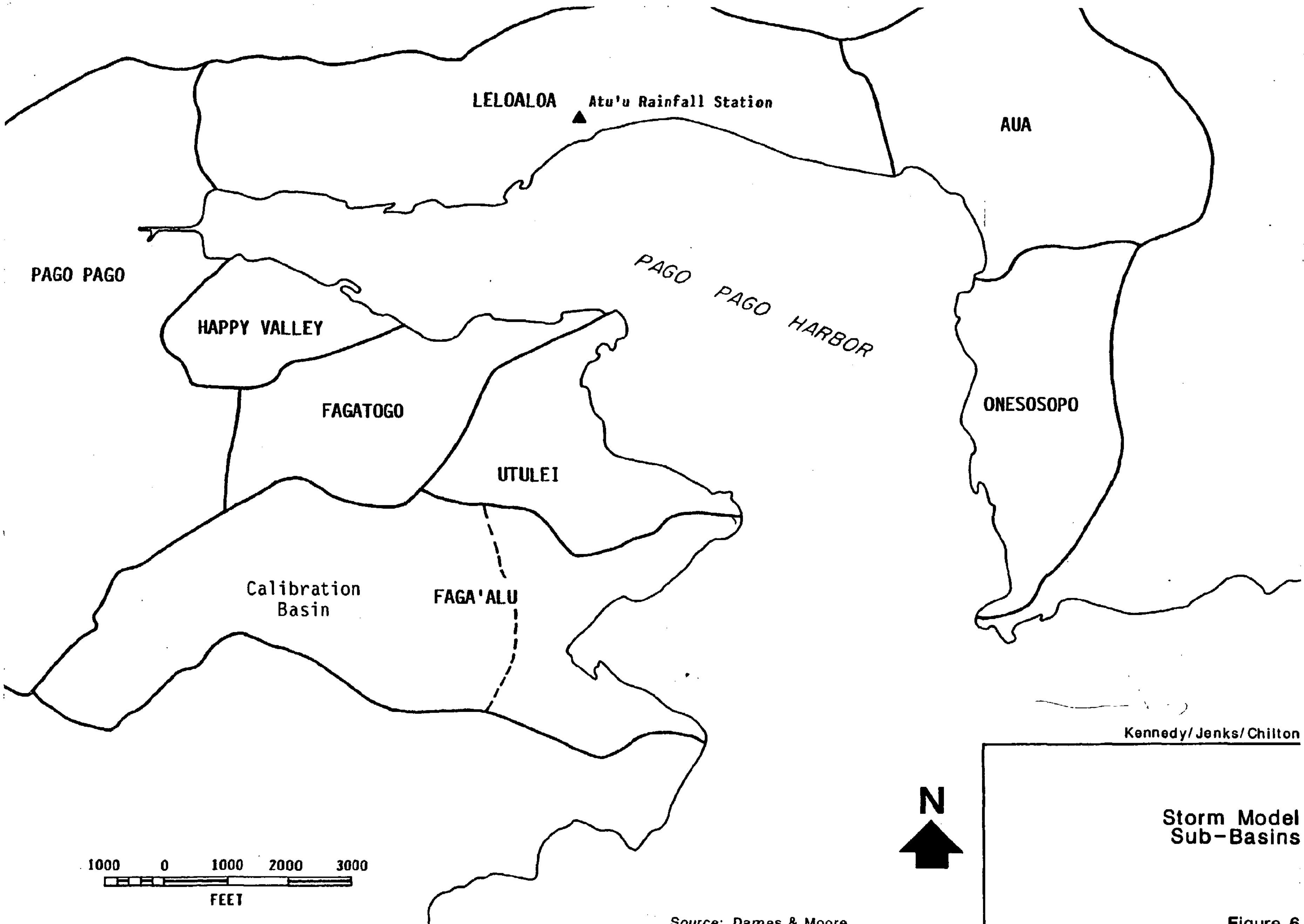


Source: Dames & Moore

Kennedy/Jenks/Chilton

Proposed
Future Land Use

Figure



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Storm Model
Sub-Basins

Figure 6

Assumptions of the Study

The existing land use and future land use scenarios were approved for use in the study by the American Samoa Government on September 15, 1985. These land use scenarios are depicted on Figures 5 and 6 and were used by the model to arrive at estimated future solids loadings into Pago Pago Harbor.

Description of the Study Area

American Samoa is the southernmost possession of the United States and consists of a group of seven islands located in the South Pacific at about 170 degrees west longitude and 14 degrees south latitude. See Figure 1. Tutuila Island is the center of government and business with a total land area of about 53 square miles. See Figure 2. Pago Pago Harbor represents the economic and social hub of American Samoa. The study area is the Pago Pago Harbor section of Mauputasi County. This hydrographic basin is bound by Sina Ridge, Maugaloa Ridge, and Papatele Ridge. See Figure 3.

DISCUSSION

Physical Description of Project Site

The islands of American Samoa are of volcanic origin with the rugged topographic relief common to Pacific volcanic islands. The islands rise precipitously from the ocean and are covered with lush tropical vegetation. Tutuila is geologically the most complex of the islands. Its spine consists of overlapping centers of volcanic activity. The north shore is deeply indented by embayments with little flat land other than at the mouth of each of the streams. The coastline is typified by high cliffs plunging directly into the ocean. The southern coastline is slightly more protected. The Tafuna-Leone Plain extends along the south side of the island from Nuuuli westward to Leone. This formation is believed to be a late stage lava flow overlying a former barrier reef during a lower sea stand, what is now Pago Pago Harbor was carved as a major stream valley. A rise in sea level flooded the former valley and produced one of the deepest and most sheltered harbors in the Pacific. Tutuila is the center of government and business with a total land area of about 53 square miles. See Figure 2. Pago Pago Harbor represents the economic and social hub of American Samoa. Visitors remember this unique combination of ocean and mountains which form shelter and harborage for fishing boats and cruise ships. Along its shores are the hustle and bustle associated with the seat of Government, commercial warehouses, farmers markets, fish canneries, marine railway, and duty free shops.

The study area is the Pago Pago Harbor section of Mauputasi County. This hydrographic basin is bound by Sina Ridge, Maugaloa Ridge, and Papatele Ridge. See Figure 3.

Point and Nonpoint Sources of Pollution

Point sources of pollution generally refer to "end of pipe" discharges which release waste materials into shore waters from municipal wastewater treatment plants and industrial plants. These types of discharges are relatively simple to monitor and are currently adequately controlled by the National Pollutant Discharge Elimination System (NPDES), established in accordance with Section 402 of the Federal Water Pollution Control Act. This program requires a permitting procedure for all point sources of pollution. After a permit is issued, each discharge is then monitored to ensure its compliance with the criteria as set forth in the conditions of the permit. The tuna packers and government outfalls are the major sources of point source discharge into the harbor and are controlled under the NPDES program of the Environmental Quality Commission (EQC).

Nonpoint source pollution refers technically to any non-specific form of pollution, including: agriculture runoff, silvicultural (forestry) runoff, urban stormwater runoff, wind erosion, urban construction runoff, and movement of wastes and other toxics through soil and into surface or groundwater. In preparing the scope of study, experience indicated that silviculture runoff and wind erosion were not evident in the study basin. These were not included in the study nor was the movement of toxics and other hazardous material. **Control of nonpoint source pollution is one of the basic concerns of American Samoa Environmental Quality Commission and Coastal Zone Management Office.** It is traditionally an urban and agricultural land use problem and impacts adjacent waters through the processes of soil erosion, sediment transport, and deposition. Many variables affect these processes and as a result the relationship between the amount of soil that is moved by the erosion process and the amount reaching receiving waters is complex. The result is that there is no clearly definable ratio between soil eroding on site and the amount reaching receiving waters.

Methodology

A method for estimating soil transport utilizing the Corps of Engineers STORM computer model was selected by American Samoa to begin addressing nonpoint sources of pollution. The model used data gathered from field investigations by Kennedy/Jenks/Chilton and a review of available literature and atlases. This data was digitized and input into the STORM program. Calibration of the modeling was based on an estimated loading from actual field monitoring. The results of the model are presented in tables depicting two scenarios representing present and future land use.

GENERAL DESCRIPTION OF THE STORM MODEL

The STORM model was primarily designed to estimate surface water runoff and sediment loading rates. See Appendix A. This information is generally used in the design of treatment and storage facilities to control the quantity and quality of stormwater runoff and land surface erosion. It may also be used, as in this project, to compare the variation in sediment loadings between existing and proposed land use scenarios. The existing and proposed land use scenarios modeled in this study are illustrated on Figures 4 and 5.

The model considered the interaction between rainfall patterns, vegetation and soil properties, ground slopes, and land use characteristics in determinig sediment load patterns into Pago Pago Harbor. Based on the available data from Kennedy/Jenks/Chilton, USGS, Soil Conservation Service, National Weather Service, and the Government of American Samoa; Kennedy/Jenks/Chilton and Dames & Moore jointly decided to consider only those factors affecting surface runoff and land surface erosion.

Governing Equations

The surface runoff was calibrated for each sub-basin by the coefficient method. This involves using the following equation:

$$R = C\,(P - f)$$

where:

R = Surface runoff for the area (inches)
C = Composite runoff coefficient
P = Rainfall in inches over the area
f = Depression storage.

The inches of runoff were converted to flow volumes when applied to the sub-basin surface area magnitudes.

Average annual runoff coefficients for the pervious and impervious areas of the sub-basin were estimated and subsequently weighted according to the total fraction imperviousness for each land use, so as to obtain a single composite runoff coefficient for each sub-basin. This coefficient converts rainfall to surface runoff and is computed as follows:

$$C = C_p + (CI - C_p) \sum_{i=I}^{L} X_i F_i$$

C_p = Runoff coefficient for pervious surfaces

CI = Runoff coefficient for impervious surfaces

X_i = Area in land use i as a fraction of the total sub-basin area.

F_i = Fraction of land use i that is impervious

L = Total number of land uses.

The composite runoff coefficient is assumed constant for each watershed regardless of rainfall characteristics or antecedent moisture conditions.

Once surface runoff is determined, the land surface erosion is computed independently by the Universal Soil Loss Equation:

Tons per acre

$$SER = EI * K * LS * C * P * SDR$$

where:

SER = Land surface erosion from the basin in tons per acre
EI = Rainfall factor based upon rainfall intensity and erosive energy
K = Soil erodibility factor based on soil properties
LS = Length slope factor, a function of ground surface slope, S, and overland flow length, L, as follows:

$$LS = \sqrt{L} \quad (0.0076 + .0053S + .00076S^2)$$

C = Cropping management, or ground cover factor
P = Erosion-control practice factor
SDR = Sediment delivery ratio.

The SER value was used to estimate various contaminant loadings (i.e., BOD, total suspended solids, etc.)

Input Data* and Assumptions

The hourly rainfall recorded at the Atu'u station (Figure 6) was assumed to be representative of that over the entire study area. The data base was created as follows:

1. Hourly rainfall values from the National Weather Service data base for Atu'u Rainfall Station were related to corresponding values at the Pago Pago Station via linear regression.

2. Median rainfall values for Pago Pago by month were converted to Atu'u rainfall values via the relationship developed in 1.

3. Average annual rainfall was calculated by adding the twelve monthly values. In this study, the average annual rainfall was calculated to be 156.35 inches.

---

* Refer to computer printouts for actual input values.

4. Actual month totals for Atu'u from April 1980 to October 1985 were computed from hourly rainfall data base and tabulated. Months with incomplete hourly rainfall records were discounted.

5. Different combinations for individual monthly rainfall values were added until their total was close to the average annual rainfall value. In this case, we arrived at a total of 155.7 inches.

6. Actual hourly rainfall values for each month (January through December) used in 5. above, were input as the model storm year for the STORM program. The actual time of occurrence and magnitude of each rainfall event are listed in the computer output.

This model storm year was held constant for all eight sub-basins and was used in the coefficient method as P and in the computation of the rainfall factor, EI, in the universal soil loss equation.

The runoff coefficients for impervious and pervious land used were default values within the STORM program, 0.90 and 0.15, respectively. Land use areas, with respect to total sub-basin areas, X_i, were obtained from the Coastal Zone Management Atlas of Samoa by planimetry. The percent imperviousness, F_i, values were estimated from the Soil Conservation Service Survey of American Samoa and areal photographs. Based on the sporadic nature of Samoa's agricultural activity in the undeveloped areas, the F_{agri} was estimated to be equal to F_{undv}. The maximum number of land uses for any single sub-basin was four, Residential (RESI), Non-Residential Urban Development (NRUD), Agricultural (Agri), and Undeveloped (Undv).

The depression storage factor was assumed to be zero based on the "flashiness" of the stream flow patterns and the steepness of the sub-basin ground slopes. With this assumption, evapotranspiration is considered negligible as it only serves to reduce the volume of water in depression storage with time.

The soil erodibility factors for the different soil classifications were previously determined by the soil conservation service and were input without alteration.

In the determination of the length slope factors, LS, the slope ranges, or groups, used were those presented in the CZM Atlas of American Samoa and the Soil Conservation Service Soil Survey. There were no data available on the overland flow length (the average distance a particle of water must travel to enter a stream or gully). Due to the low confidence level of this value at any magnitude, the flow length was altered during calibration. Once assessed, this value was held constant for all land uses, soil classifications, and slope groups.

The ground cover factors for each land use classification were estimated from ranges published in the Soil Conservation Service, Erosion and Sediment Control, and from areal photographs of the study area. The ground cover for the residential and urban areas was assessed to be covered by grass sod and the undeveloped areas comprised of well stocked, unmanaged (in which fires and grazing of undergrowth are not controlled), woodland. The agricultural areas were intially assessed as being covered by broad leafy crops, but this value was adjusted during calibration to a value similar to the undeveloped areas. This was justified by the sporadic agricultural activity in the undeveloped areas.

The erosion control practice factor was discounted as there is no widespread, manmade control of erosion in the study area.

The sediment delivery ratio or the amount of sediment in the outflow from the study area versus the amount delivered to the stream channel, was determined as a function of each individual sub-basin area in square miles. The input value was interpolated from Table 7 of the STORM model users manual.

Input of design treatment and storage rates of the sub-basin outflow is required to run the model. Since these factors are not to be considered, values of 0 for each were inputted.

Calibration

The model was calibrated by Dames & Moore utilizing stream quality data provided by Kennedy/Jenks/Chilton. Based upon stream quality test results and a storm event equivalent to 0.10-inch of rainfall, a sediment loading of 466 pounds (0.23 tons) was estimated. Sub-basin characteristics were assessed with respect to existing conditions.

The "Calibration Sub-Basin" associated with the stream quality sampling point is indicated on Figure 6 as the area west of the dotted line (516 acres). Factors not clearly defined in the literature were altered until the output from the calibration sub-basin matched the desired loading. The main values varied are as follows:

1. Overland flow length - Low confidence level of this value at any magnitude due to lack of study prompted its use as a calibration variable. The program is highly sensitive to this value.

2. The model incorporates a slope factor which reflects the characteristic of the ground slopes as tending to the lower or higher limit of their range. The Soil Conservation Service and the CZM Atlas of American Samoa indicated that the slopes tend slightly to the lower limit, hence a slope factor of 0.40 was used. The result of this is a representative slope for a particular range that is slightly lower than the average of the lower and higher limits.

3. The ground cover factor, C, for agriculture was determined to be near the high end of the factors for well stocked, unmanaged, woodland (whereas the C for the undeveloped areas was near the lower limit).

The model was able to match the Kennedy/Jenks/Chilton sediment load value and was determined to be ready for the production runs.

Output

The results of the model study on the two land use scenarios are presented on computer printouts. The general format of the output is listing the input data and the surface runoff for each sub-basin. After this information is listed for all eight basins, the sediment loading out of each sub-basin is printed out with respect to each land use classification and total sub-basin loading into Pago Pago Harbor. See Appendix B.

POINT AND NONPOINT SOURCE POLLUTANTS SELECTION

The model results were extrapolated to reflect American Samoa Government interests by including nitrogen, phosphorous, and BOD_5 in addition to total suspended solids. Excerpts from the American Samoa Government Water Quality Standards follow. Notice the stress placed on keeping the quality of Pago Pago Harbor waters as clean as practical. Specific criteria is listed for Pago Pago Harbor to include phosphorous, nitrogen, Chlorophyll a, turbidity, light penetration, dissolved oxygen, and pH. (See excerpts Part C.) These criteria involve plant nutrients and harbor fauna productivity.

"B. Embayments

1. Description:

An embayment is a body of water subject to tidal action and bounded by headlands which restrict the exchange of water with the open ocean. A bay or lagoon is an embayment if the ratio of the volume of water in the bay (in cu. ft.) to the cross-sectional area (sq. ft.) of the bay at the entrance is more than 700 determined at mean lower low water. Consequently, the residence time of water in embayments, as opposed to open coastal areas, allows for the accumulation of land drainage materials which influence water quality and marine ecosystems.

Examples of embayments are Pago Pago Harbor beginning at line drawn from Blunt's Point to Breaker's Point and Pala Lagoon inside of a line drawn from the easternmost point of the airport to the nearest part of Coconut Point.

"2. Objective:

All embayments are to remain in as nearly their natural state as possible.

"3. Pago Pago Harbor:

A large, deep and majestically beautiful seaport, Pago Pago Harbor has been designated by the American Samoa Government to be developed into a transshipment center for the South Pacific. In addition, the fishing and canning industry, which is important to the economic development of the territory, is located in Pago Pago Harbor. The surrounding area is the population center of Tutuila.

The EQC realizes that industrial development will stress the water quality in the harbor. At the same time, the harbor is widely used as a source of recreation and food by many of the island's residents. Recognizing its unique position as an embayment where water quality has been degraded from the natural condition, the EQC has established a separate set of water quality standards for Pago Pago Harbor.

"C. The following standards apply specifically to Pago Pago Harbor:

Parameter	Median Not To Exceed the Given Value	Not to Exceed Given Value 10% of the Time	Not to Exceed Given Value 2% of the Time
Turbidity (NTU)	0.75	1.0	1.5
Total Phosphorous (ug P/1)	30	60	90
Total Nitrogen (ug N/1)	200	350	500
Chlorophyll a (ug/1)	1.0	3.0	5.0

Parameter	Median Not To Exceed the Given Value	Not to Exceed Given Value 10% of the Time	Not to Exceed Given Value 2% of the Time
Light Penetration Depth (ft.)	65*	45*	35*

Dissolved oxygen: Not less than 70% saturation or less than 5.0 mg/l. If the natural level of D.O. is less than 5.0 mg/l, the natural level shall become the standard.

The pH range shall be 6.5 to 8.6 and be within 0.2 pH units of that which would occur naturally.

*To exceed given value 50, 90 and 98% of the time respectively."

The pollutant data was extrapolated as follows: The STORM model manual was reviewed to obtain prevailing national U.S. average values for the pollutants of interest. A table of pollutant yield rates categorized by land use and pollutant type was compiled from the average national values. The yield rates in this application were adjusted to account for actual physical conditions observed in American Samoa such as the heavy ground cover, absence of sediment transport on steep farm slopes and the lack of sediment transport in the wet weather flows observed. The adjusted yield rates were then applied to the surface area of each land use type by basin to determine the annual pollutant loadings. The annual total suspended solids yield was obtained from the model output printout and related to the previously described yield rate. This relationship is expressed as a ratio and is applied to all land use types to obtain BOD_5, and Nutrients (N & P) for each sub-basin. See Appendix C.

The point sources in the study area are the Star Kist and Van Camp fish canneries and the Utulei wastewater treatment plant. Information on the quality and quantity of discharges from these sources were obtained from the Draft Phase 1 Report prepared by CH_2M Hill. A comparison of point and modeled nonpoint discharges into the harbor will be prepared as Table 5.

WATER QUALITY STANDARDS AND BEST MANAGEMENT PRACTICES

The output of the model show that erosion and sediment transport may be of concern (see Table 2). The American Samoa Government address erosion and sediment transport in Section VI.A.11 of the Water Quality Standards for American Samoa. This is quoted as follows:

> "Soil particles resulting from erosion on land involved in earthwork, such as the construction of public works; highways, subdivisions; recreational, commercial, or industrial developments; or the cultivation and management of agricultual lands shall not enter any water of the territory. This standard shall be deemed met upon a showing that the land on which the erosion occurred or is occurring is being managed in accordance with soil conservation practices acceptable to the Director of Agriculture, the EQC and the Director of Health, and that a comprehensive conservation program is being actively pursued, or that the discharge has received the best degree of treatment or control, and that the severity of impact of the residual soil reaching the receiving body of water is deemed to be acceptable."

Pollution emanating from nonpoint sources, such as sediment and urban stormwater runoff, is much more economically and effectively controlled at its source rather than by treating it once it has been carried off and deposited downstream. Treating such contaminated water generally is an unacceptable method of pollution abatement because technology frequently cannot address the problem effectively, treatment costs are prohibitive and cleanup efforts cannot proceed quickly enough to guarantee prevention of damage to ecosystems affected by the polluted waters.

While onsite management of such problems is often relatively expensive, it is the preferred means of control (208 plan). Such a pollution control measure is referred to as a Best Management Practice (BMP). BMP's are methods that allow use of a natural resource without detriment to the environment or final depletion of the resource. BMP is defined in EPA regulations as follows:

> "The term Best Management Practices (BMP) means a practice, or combination of practices, that is determined by a State (or designated areawide planning agency) after problem assessment, examination of alternative practices and appropriate public participation to be the most effective, practicable (including technological, economic and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals." (40 CFR Part 130)

Best management practices, by controlling sediment, also control other water pollutants like toxic substances, nutrients and heavy metals in transit, as well as biopathogens from animal concentration sites.

BMP's can be broken down into two categories: structural and nonstructural. Structural measures refer to those practices which involve construction on or around the periphery of the land site to contain or treat sediment. These measures generally do not stop or slow the erosion onsite, but stop the eroded soil and other materials from leaving the site. This is a relatively expensive means of nonpoint source pollution control and includes diversions (dikes, ditches and terraces), filters, traps and basins.

Nonstructural measures actually slow down the erosion process and reduce the amount of sediment entering a receiving water. These are the ideal methods of nonpoint source pollution control and include practices like vegetative stabilization, vegetative filters, mulches, nettings and chemical binders. Management and planning are also applicable nonstructural measures. For construction projects, it is possible to plan grubbing and grading activities to occur during the dry months of the year, thus eliminating the single most important climatic factor which causes erosion and sedimentation - rainfall. For some agricultural operations, it is possible to rotate crops, rotate and defer grazing in certain areas and to manage irrigation waters.

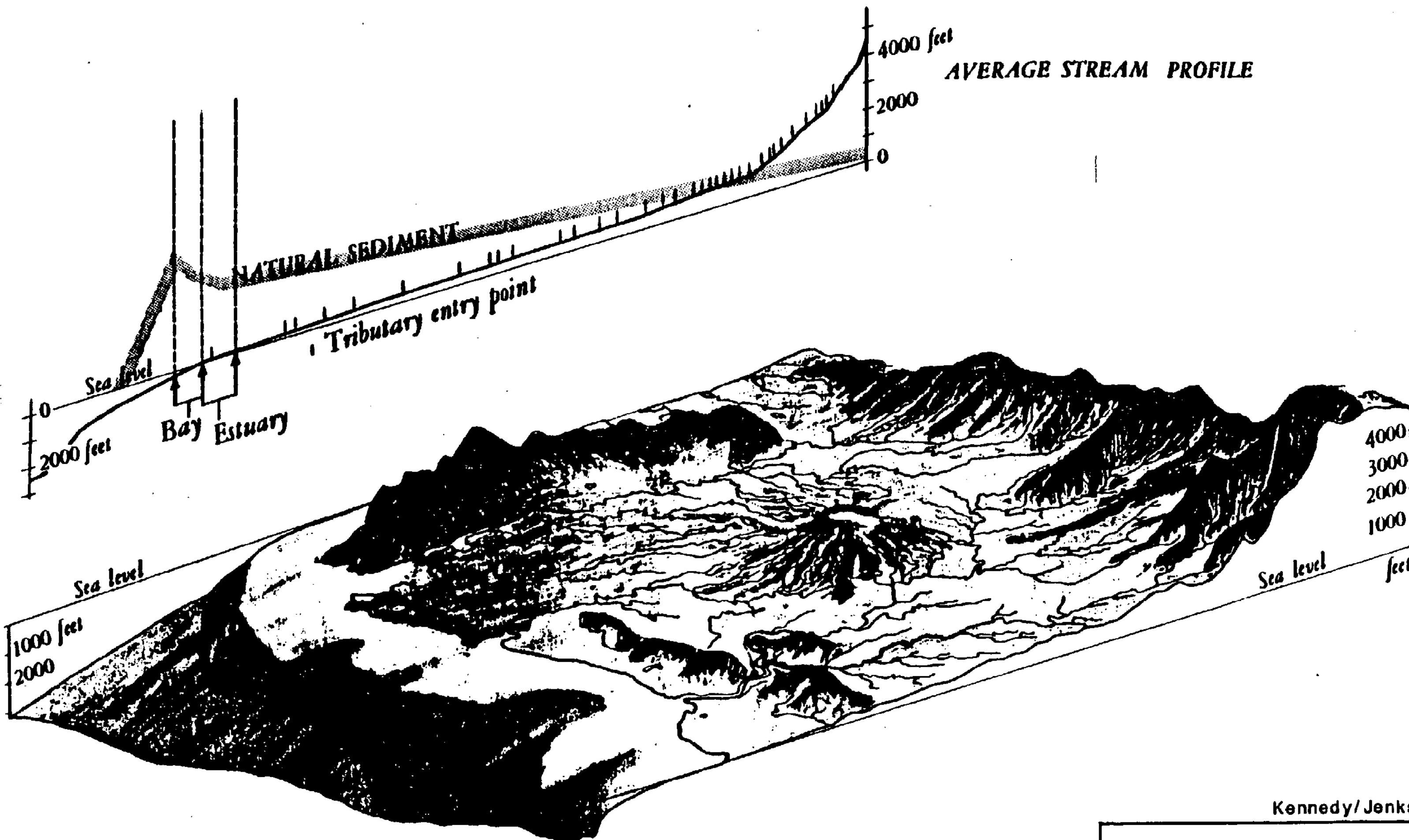
Man's land disturbing activities (for agricultural operations and grading and grubbing for urban development) can magnify the erosion process by devegetating large areas of land, leaving them susceptible to those climatic factors which cause erosion and sedimentation. Figures 7 and 8 are schematic representations of the sediment produced naturally in an island watershed contrasted with the sediment produced by a developed island watershed.

Appendix D contains a list of best management practices from the State of Hawaii functional plans. The costs listed are not current and the measures are mentioned here for information and guidance only. Implementation of some of the appropriate measures may assist the American Samoa Government in protecting the water quality of Pago Pago Harbor.

RESULTS AND CONCLUSIONS

Results

Land use changes anticipated for the Pago Pago Harbor study area are graphically shown on Figures 4 and 5. This information is also presented in Table 1 categorized by land use and area in acres. A conversion of undeveloped land to residential use is shown for Faga'alu, Utulei, Fagatogo, and Happy Valley sub-basins. In Pago Pago, portions of land use shift from undeveloped and agricultural to residential. In Leloaloa, land use changes are expected to convert some agricultural and residential land to urban. The Aua basin changes some land use from agricultural to residential. There are no changes indicated for Onesosopo. It is estimated that 116 acres of undeveloped land and 62



Source: Water Quality Management Plan for the County of Kauai

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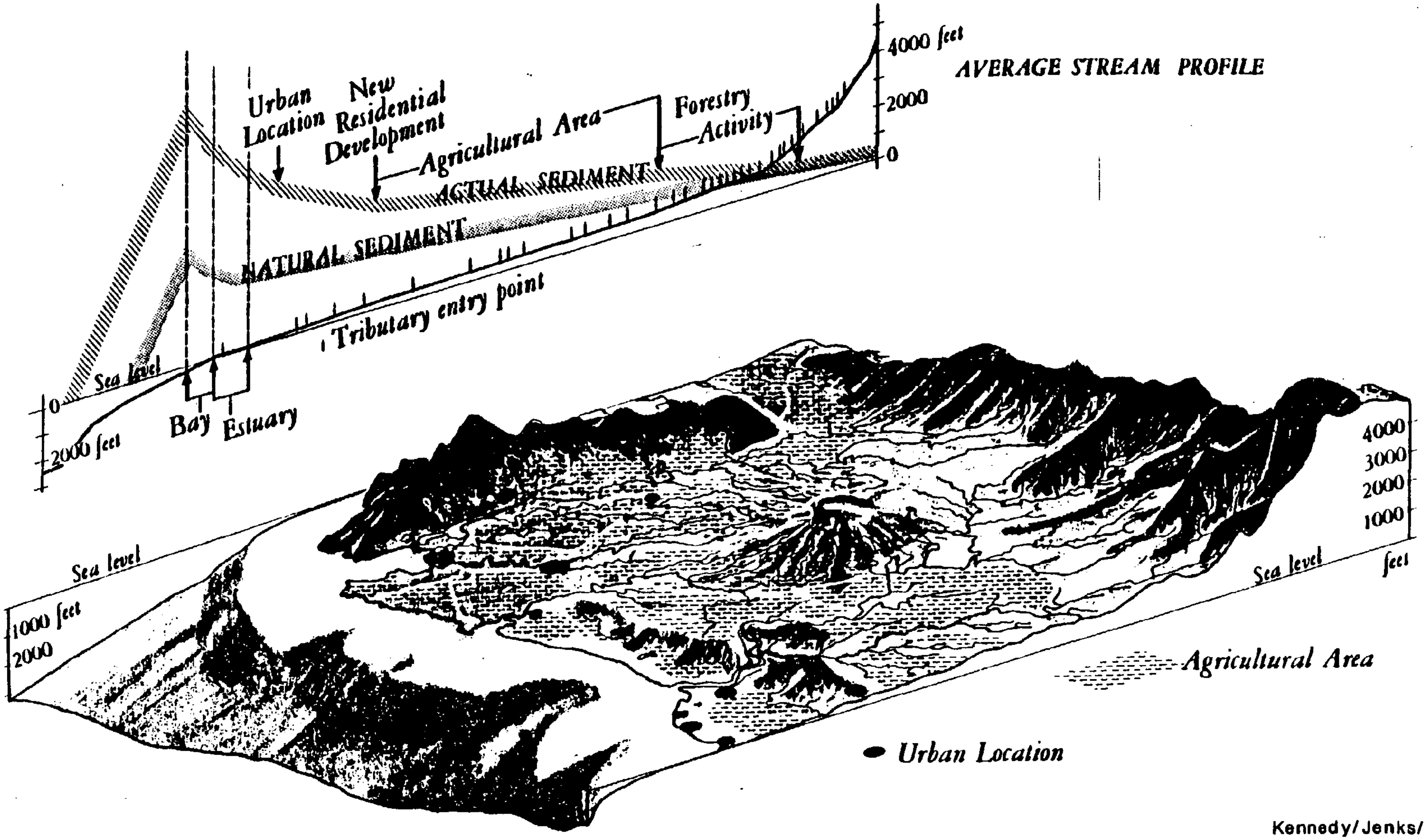
An Island Watershed

Figure 7



Source: Water Quality Management Plan for the County of Kauai

Kennedy/Jenks/Chilton

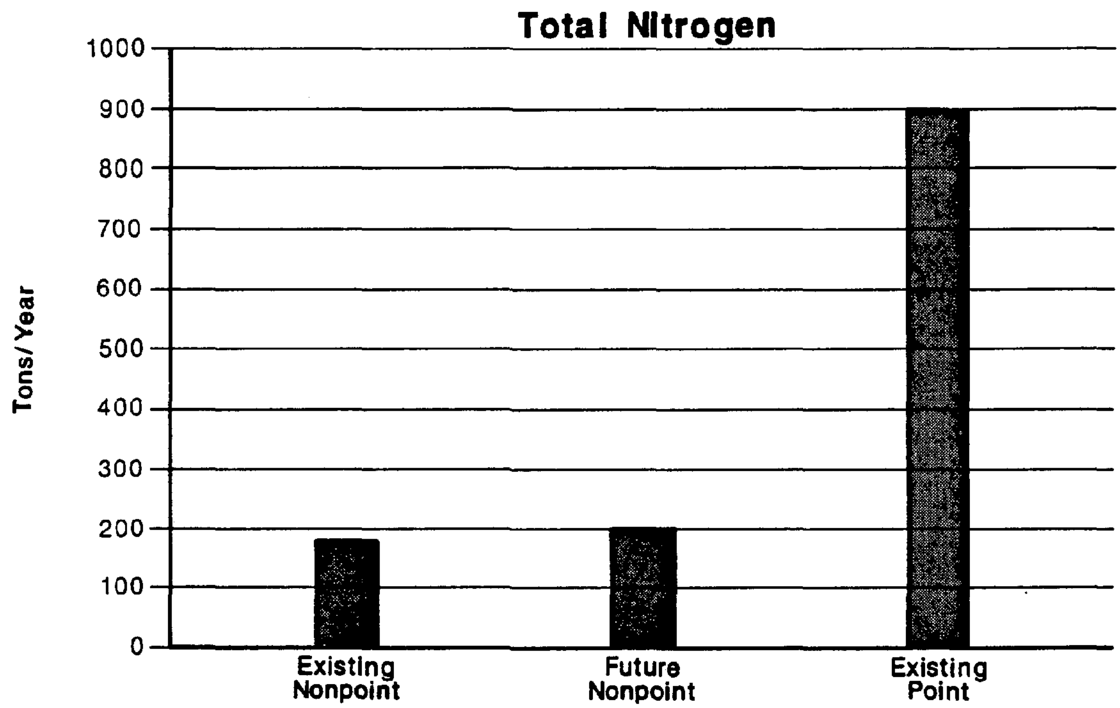
A Developed Watershed

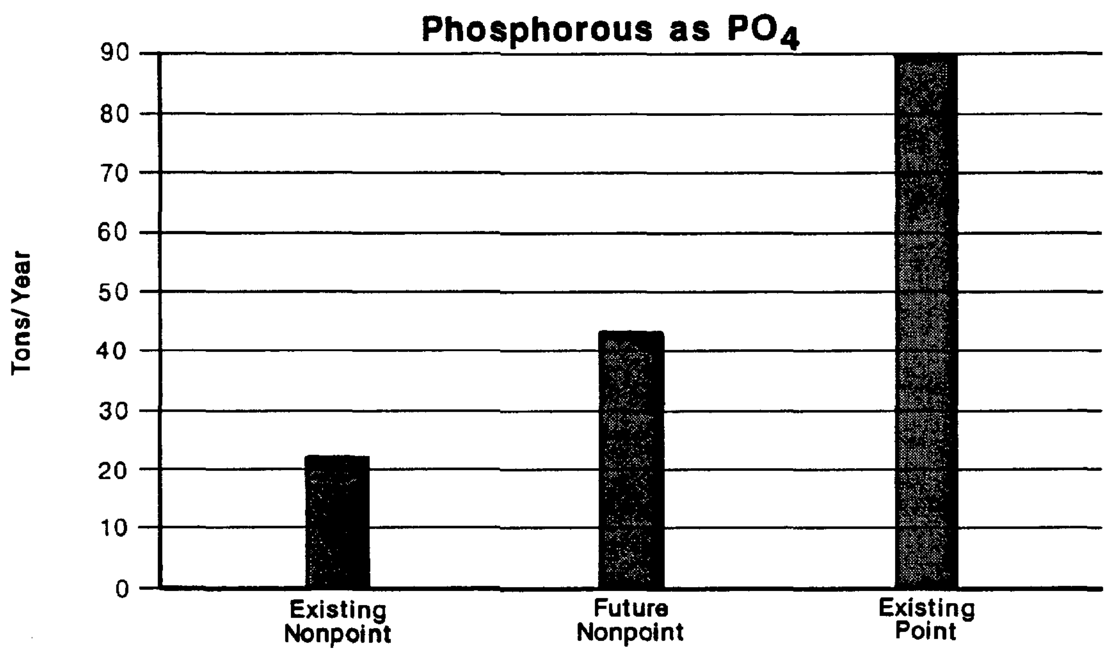
Figure 8

TABLE 1

Estimated Land Use Changes

Basin	Type	Acres Existing	Acres Future	Change
**************************				
Faga'alu	Undeveloped	599.70	551.20	-48.50
	Agricultural	16.20	16.20	
	Residential	61.20	109.70	48.50
	Urban	26.00	26.00	
	Subtotal	703.10	703.10	
Utulei	Undeveloped	63.90	41.90	-22.00
	Agricultural	0.00	0.00	
	Residential	74.00	95.90	22.00
	Urban	42.10	42.10	
	Subtotal	180.00	179.90	
Fagatogo	Undeveloped	118.00	109.90	-8.10
	Agricultural	0.00	0.00	
	Residential	76.00	84.10	8.10
	Urban	25.00	25.00	
	Subtotal	219.00	219.00	
Happy Valley	Undeveloped	74.00	66.00	-8.00
	Agricultural	0.00	0.00	
	Residential	35.00	43.00	8.00
	Urban	10.00	10.00	
	Subtotal	119.00	119.00	
Pago Pago	Undeveloped	563.00	533.40	-29.60
	Agricultural	156.60	112.80	-43.20
	Residential	154.80	228.20	73.40
	Urban	20.60	20.60	
	Subtotal	895.00	895.00	
Leloaloa	Undeveloped	221.10	221.10	
	Agricultural	136.70	123.70	-13.00
	Residential	123.70	120.00	-3.70
	Urban	56.50	73.20	16.70
	Subtotal	538.00	538.00	
Aua	Undeveloped	320.40	320.40	
	Agricultural	5.20	0.00	-5.20
	Residential	67.20	72.40	5.20
	Urban	7.20	7.20	
	Subtotal	400.00	400.00	
Onesosopo	Undeveloped	186.90	186.90	
	Agricultural	21.10	21.10	
	Residential	56.00	56.00	
	Urban	0.00	0.00	
	Subtotal	264.00	264.00	
Pago Pago Harbor Total		3,318.10	3,318.00	

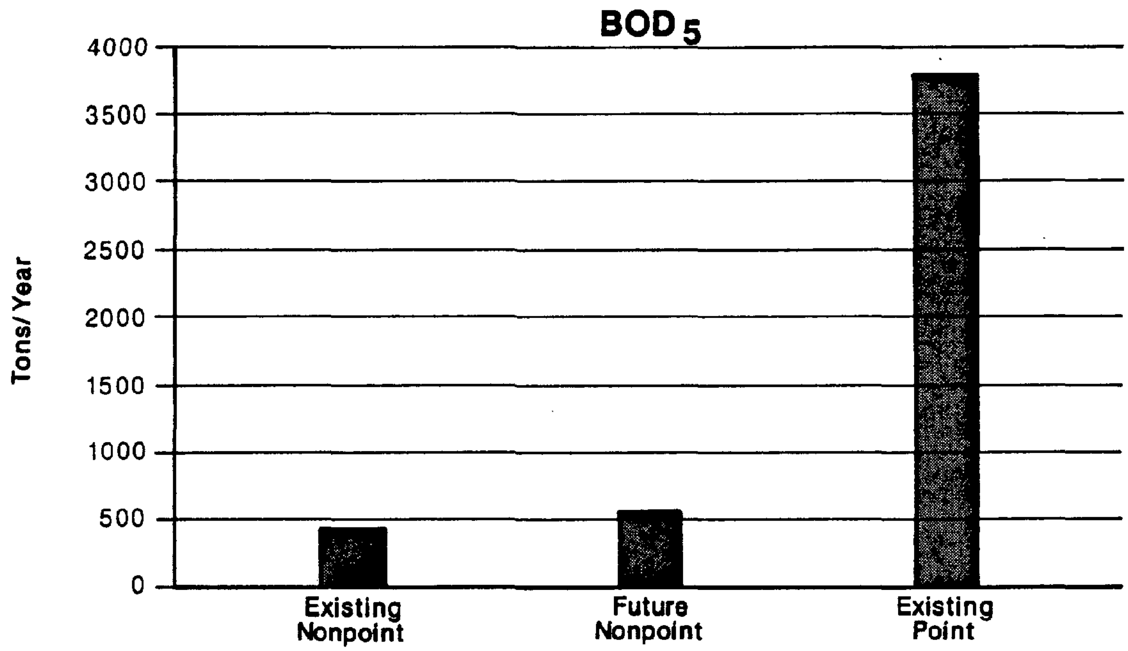


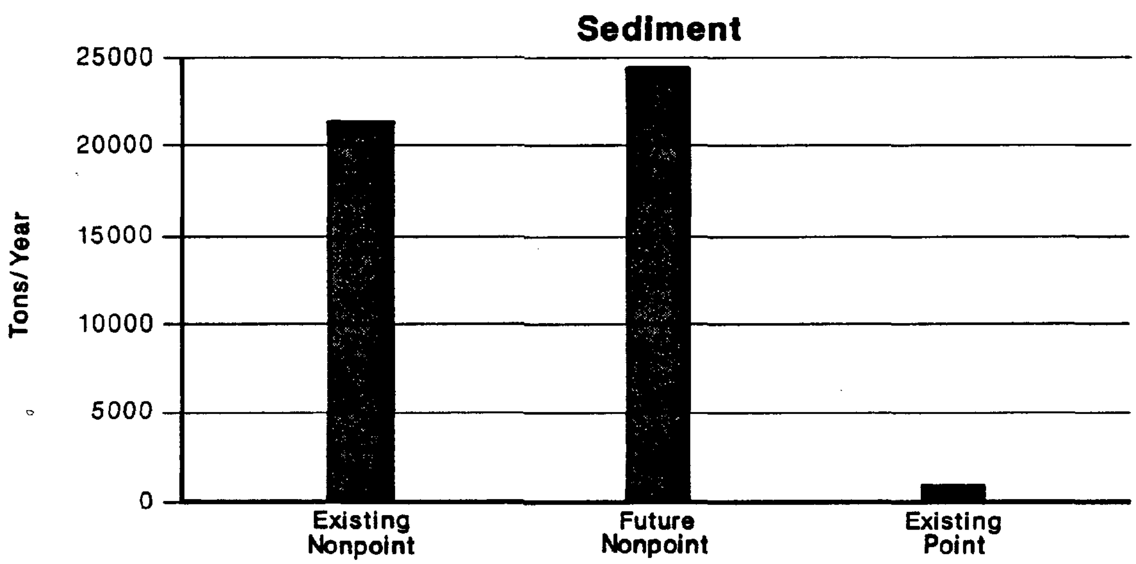


Kennedy/Jenks/Chilton

Comparison of Existing/Future Nonpoint & Existing Point Sources

Figure 9





Kennedy/Jenks/Chilton

Comparison of
Existing/Future Nonpoint
& Existing Point Sources

Figure 10

acres of agricultural land will be converted to 161 acres of residential and 17 acres of urban use land in the study area.

The amount and rate of soil erosion by sub-basin and the delivery of the sediment to Pago Pago Harbor are summarized in Tables 2 and 3. These tables show the estimated amount of soil which is eroded in a basin and the amount of soil that is expected to be transported under median year rainfall into the harbor. The sediment delivered to the harbor is generally a fraction of that which is eroded. For existing land use conditions, it is estimated that 21,676 tons of sediment will be delivered to the harbor annually. The model results show the amount delivered to increase 24,690 tons annually as a result of the changes in land use.

The American Samoa Government water quality standard stresses nutrients, solids, BOD_5 and other biological production parameters within Pago Pago Harbor. The computer model produced information on these water quality standard parameters in two sets to evaluate existing and future land use impacts. Existing and future land use values for sediment, phosphorous, total nitrogen, and BOD_5 are compared in Table 4 by sub-basins.

Point and nonpoint sources form the major pollutant source for the harbor. A comparison of the proportionate contributions may assist in the prioritization of resources for harbor cleanup. Existing and future nonpoint, and point source discharges are shown in Table 5 and Figures 9 and 10. The table and figures provide a graphic comparison of the contributions of the point sources (canneries, wastewater treatment plant) and nonpoint sources.

The changes in land use estimated for the study area will result in an increase in pollutant loading into Pago Pago Harbor. A summary of the changes in land use and increases in sediment, total nitrogen, phosporous, and BOD_5 pollutants for the study area is found in Table 6.

Conclusions

The data available from the CZM Atlas, National Weather Service, USGS, and limited field sampling will support the use of the STORM model for small hydrologic basins in American Samoa.

The modeling results can be refined with further field sampling. This would result in closer calibration of the model with field conditions.

The projected changes in land use appear to increase the sediment, nutrient, and BOD_5 carried into Pago Pago Harbor by runoff from nonpoint sources. See Table 4.

Surprise?

TABLE 2

Kennedy/Jenks/Chilton

Existing Erosion and Sediment Delivery

Land Surface Erosion and Sediment Delivery per year						
Basin	**Land Use**	**Land Surface Erosion**				
		(Acres)	(Tons)	(Tons/acres)	(Tons)	(Tons/acre)
Faga'alu	Undeveloped	600	14379	24.0	4026	6.7
	Agricultural	16	190	11.7	53	3.3
	Residential	61	3371	55.1	944	15.4
	Urban	26	103	4.0	29	1.1
	Subtotal	703	18042	25.7	5052	7.2
Utulei	Undeveloped	64	791	12.4	316	4.9
	Agricultural	0		0.0		0.0
	Residential	74	4404	59.5	1762	23.8
	Urban	42	167	4.0	67	1.6
	Subtotal	180	5362	29.8	2145	11.9
Fagatogo	Undeveloped	118	2780	23.6	1056	8.9
	Agricultural	0		0.0		0.0
	Residential	76	3185	41.9	1210	15.9
	Urban	25	99	4.0	38	1.5
	Subtotal	219	6064	27.7	2304	10.5
Happy Valley	Undeveloped	74	1847	25.0	757	10.2
	Agricultural	0		0.0		0.0
	Residential	35	1129	32.3	463	13.2
	Urban	10	40	4.0	16	1.6
	Subtotal	119	3015	25.3	1236	10.4
Pago Pago	Undeveloped	563	12934	23.0	3492	6.2
	Agricultural	156	5166	33.1	1395	8.9
	Residential	155	6922	44.7	1869	12.1
	Urban	21	82	4.0	22	1.1
	Subtotal	894	25105	28.1	6778	7.6
Leloaloa	Undeveloped	221	5709	25.8	1713	7.7
	Agricultural	137	6436	47.1	1931	14.1
	Residential	124	1281	10.4	384	3.1
	Urban	57	290	5.1	87	1.5
	Subtotal	538	13716	25.5	4115	7.6
Aua	Undeveloped	320	5176	16.2	1656	5.2
	Agricultural	5		0.0		0.0
	Residential	67	287	4.3	92	1.4
	Urban	7	29	4.0	9	1.3
	Subtotal	400	5492	13.7	1757	4.4
Onesosopo	Undeveloped	187	2173	11.6	761	4.1
	Agricultural	21	1327	62.9	464	22.0
	Residential	56	222	4.0	78	1.4
	Urban	0		0.0		0.0
	Subtotal	264	3722	14.1	1303	4.9
Totals		3318	80518	24.3	24690	7.4

TABLE 3

Kennedy/Jenks/Chilton

Future Erosion and Sediment Delivery

Land Surface Erosion and Sediment Delivery per year						
Basin	**Land Use**	**Land Surface Erosion**				
		(Acres)	(Tons)	(Tons/acres)	(Tons)	(Tons/acre)
Faga'alu	Undeveloped	600	14379	24.0	4026	6.7
	Agricultural	16	190	11.7	53	3.3
	Residential	61	3371	55.1	944	15.4
	Urban	26	103	4.0	29	1.1
	Subtotal	703	18042	25.7	5052	7.2
Utulei	Undeveloped	64	791	12.4	316	4.9
	Agricultural	0		0.0		0.0
	Residential	74	4404	59.5	1762	23.8
	Urban	42	167	4.0	67	1.6
	Subtotal	180	5362	29.8	2145	11.9
Fagatogo	Undeveloped	118	2780	23.6	1056	8.9
	Agricultural	0		0.0		0.0
	Residential	76	3185	41.9	1210	15.9
	Urban	25	99	4.0	38	1.5
	Subtotal	219	6064	27.7	2304	10.5
Happy Valley	Undeveloped	74	1847	25.0	757	10.2
	Agricultural	0		0.0		0.0
	Residential	35	1129	32.3	463	13.2
	Urban	10	40	4.0	16	1.6
	Subtotal	119	3015	25.3	1236	10.4
Pago Pago	Undeveloped	563	12934	23.0	3492	6.2
	Agricultural	156	5166	33.1	1395	8.9
	Residential	155	6922	44.7	1869	12.1
	Urban	21	82	4.0	22	1.1
	Subtotal	894	25105	28.1	6778	7.6
Leloaloa	Undeveloped	221	5709	25.8	1713	7.7
	Agricultural	137	6436	47.1	1931	14.1
	Residential	124	1281	10.4	384	3.1
	Urban	57	290	5.1	87	1.5
	Subtotal	538	13716	25.5	4115	7.6
Aua	Undeveloped	320	5176	16.2	1656	5.2
	Agricultural	5		0.0		0.0
	Residential	67	287	4.3	92	1.4
	Urban	7	29	4.0	9	1.3
	Subtotal	400	5492	13.7	1757	4.4
Onesosopo	Undeveloped	187	2173	11.6	761	4.1
	Agricultural	21	1327	62.9	464	22.0
	Residential	56	222	4.0	78	1.4
	Urban	0		0.0		0.0
	Subtotal	264	3722	14.1	1303	4.9
Totals		3318	80518	24.3	24690	7.4

SI Same
Table

TABLE 4

Existing Nonpoint Source Annual Outputs

	Basin Name	Area (Acres)	Sediment (Tons)	PO_4 (Tons)	Total Nitrogen (Tons)	BOD_5 (Tons)
1	Faga'alu	703.10	4804.4	4.3	46.7	99.2
2	Utulei	180.00	1306.8	3.9	9.6	34.6
3	Fagatogo	219.00	1406.3	1.4	13.4	29.4
4	Happy Valley	119.00	921.7	0.8	8.9	19.1
5	Pago Pago	894.40	6388.1	6.8	51.8	127.5
6	Leloaloa	537.90	3790.6	2.6	29.3	70.0
7	Aua	400.00	1756.1	1.5	17.3	36.1
8	Onesosopo	320.00	1302.7	1.0	10.9	25.1
	TOTALS	3373.40	21675.8	22.3	187.9	441.0

Future Nonpoint Source Annual Outputs

	Basin Name	Area (Acres)	Sediment (Tons)	PO_4 (Tons)	Total Nitrogen (Tons)	BOD_5 (Tons)
1	Faga'alu	703.10	5051.9	7.1	46.6	111.5
2	Utulei	180.00	2145.0	8.7	13.9	62.7
3	Fagatogo	219.00	2304.3	6.5	18.0	59.7
4	Happy Valley	119.00	1236.2	2.7	10.5	29.9
5	Pago Pago	894.40	6778.2	11.8	54.7	151.0
6	Leloaloa	537.90	4114.8	3.8	31.1	78.9
7	Aua	400.00	1757.4	1.5	17.3	36.2
8	Onesosopo	320.00	1302.7	1.0	10.9	25.1
	TOTALS	3373.40	24690.6	43.2	203.0	555.0

TABLE 5

Existing Point and Nonpoint Source Comparison
(Tons/Year)

Name	Sediment	Total N	Total P	BOD_5
Existing Nonpoint	21676	188	22	441
Future Nonpoint	24690	203	43	555
Point Existing*	1000**	912	90	3811

*Data extracted from Phase 1 Report Draft by Ch2M Hill.

**Total suspended solids.

TABLE 6

Summary of Changes in Pago Pago Harbor Basin

A. Land Use (Acres)

	Undeveloped	Agriculture	Residential	Urban	Total
Existing	2147.00	335.80	647.90	187.40	3318.10
Future	2030.80	273.80	809.30	204.10	3318.00
Change	116.20	62.00	161.40	16.70	
% Change	(-)5.41%	(-)18.46%	(+)24.91%	(+)8.91%	

B. Pollutants (Tons/Year

	Sediment	Total Nitrogen	Phosphorous	BOD_5
Existing	21675.81	187.87	22.31	440.96
Future	24690.60	202.99	43.19	555.04
Change	3014.79	15.11	20.88	114.08
% Change	(+)13.91%	(+)8.05%	(+)93.58%	(+)25.87%

Nonpoint source impacts may be lessened through the application of Best Management Practices (State of Hawaii Department of Health).

The combined point source (canneries and wastewater treatment plant) contribution of pollutants in the study area is estimated to be 2 to 6 times greater than the combined nonpoint source contribution. See Figures 9 and 10.

The sediment contribution from nonpoint sources is approximately 22 to 25 times greater than the total suspended solids input of the canneries and wastewater treatment plant. See Table 5 and Figure 10.

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BIBLIOGRAPHY

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APPENDICES

APPENDIX A
STORM MODEL

APPENDIX A - DESCRIPTION OF STORM MODEL

PURPOSE OF THE MODEL

This model provides a means for analysis of the quantity and quality of runoff from urban or nonurban watershed. The two main types of output are statistical information on quantity and quality of washoff and overflow and pollutographs for selected individual events. Loads and concentrations of six basic water quality parameters are computed (suspended and settleable solids, biochemical oxygen demand, total nitrogen, orthophosphate, and total coliform). Land surface erosion is also computed. The model can aid in the sizing of storage and treatment facilities as well as characterize the quantity and quality of storm water runoff and land surface erosion. The model considers the interaction of seven storm water elements:

- rainfall
- runoff
- dry weather flow
- pollutant accumulation and washoff
- land surface erosion
- treatment rates
- detention reservoir storage

The program is designed for period of record analysis using continuous hourly precipitation data. It is, therefore, a continuous simulation model although it may also be used for single events.

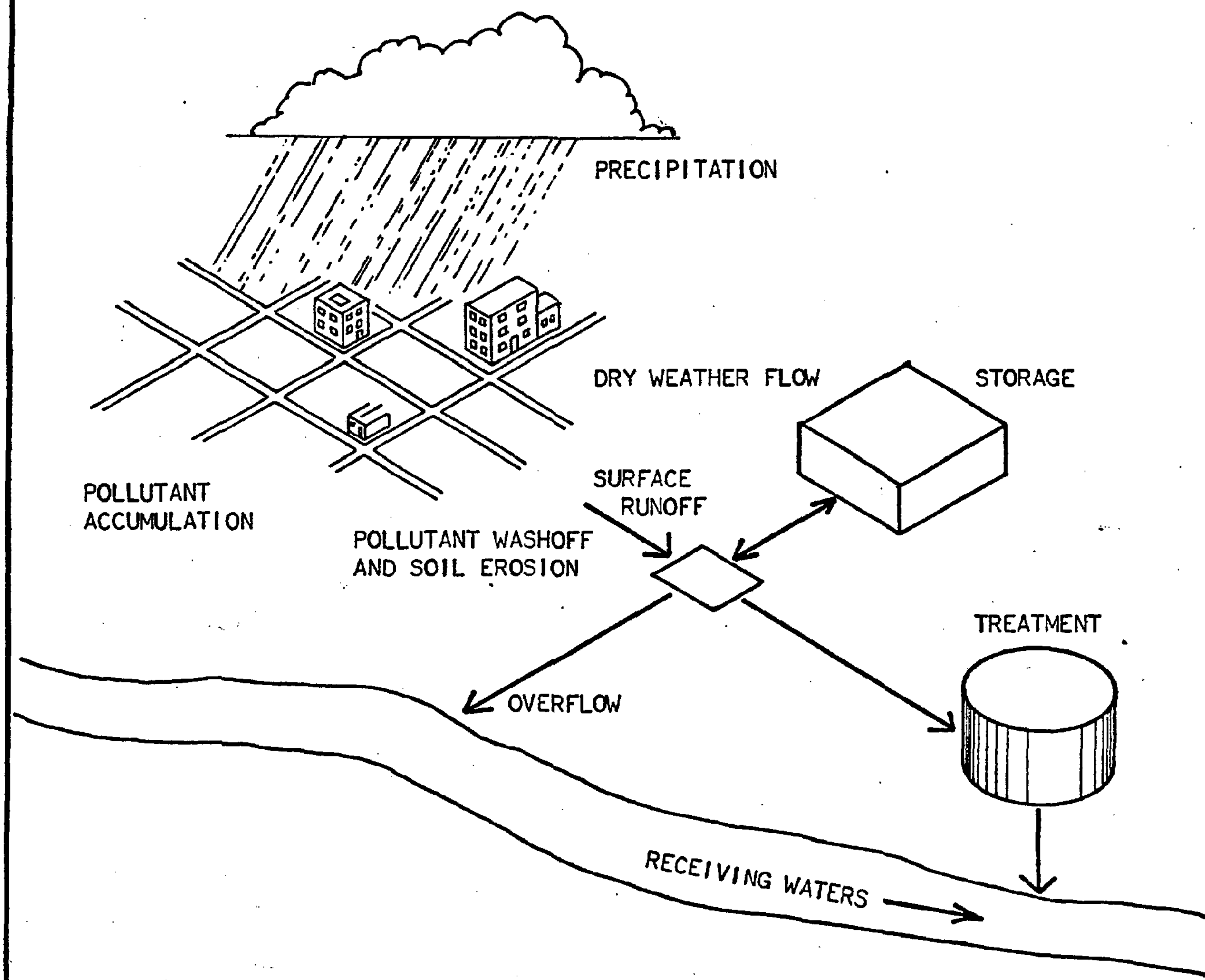
DESCRIPTION OF THE PROGRAM

Plate B-1 shows a schematic representation of the seven storm water elements modeled by STORM. In the model, rainfall washes dust and dirt and the associated pollutants off the watershed. The resulting runoff is routed to treatment-storage facilities, if available, where runoff less than or equal to the treatment rate is treated and released. Runoff exceeding the capacity of the treatment plant is stored for treatment at a later time. If storage is exceeded, the untreated excess is wasted through overflow directly into the receiving waters. If no treatment or storage is available, the quantity and quality of the direct runoff is generated.

The following sections describe the methodology of the approach used in estimating storm water runoff quantity and quality. The four major steps involved are (1) the computation of runoff quantity, (2) the computation of runoff quality, (3) the computation of treatment, storage, and overflow, and (4) computation of land surface erosion.

Computation of the Quantity of Runoff

Runoff quantity can be computed by one of three methods, the coefficient method, the U.S. Soil Conservation Service Curve Number Technique, or a combination of the two. The coefficient method specifies that a certain fraction of rainfall will run off each hour of each rainfall event while the SCS method uses a rainfall-runoff relationship based on antecedent conditions for each rainfall event. The third option uses the coefficient



MAJOR PROCESSES MODELED BY STORM

method on impervious areas and the SCS method of pervious areas, weighting the sum according to the total fraction of impervious area.

Computation of the Quality of Runoff

Pollutants tend to accumulate on the land surface in many ways. Some of the most common accumulations occur in debris dropped or scattered by people, sidewalk sweepings, or erosion, and debris from construction or renovations, remnants of household refuse, residue from automobile exhaust and tires, and the fallout of particulate matter from the air. Irrespective of the way in which pollutants tend to accumulate on the watershed, they can be generally classified into one of the following categories of street litter: rags, paper, dust and dirt, vegetation, and inorganics.

Some of the most significant water quality parameters include suspended and settleable solids, chemical and biochemical oxygen demand, nitrogen, phosphorous and coliform bacteria. Other pollutants found in stormwater runoff can include pesticides, herbicides, and numerous inorganic constituents.

Two methods for specifying pollutant accumulation are available in STORM, the dust and dirt method, and the daily pollutant accumulation method.

The dust and dirt method assumes that all pollutants are associated with the dust and dirt accumulation in the streets. A study done in Chicago concluded that the most significant category of street litter is dust and dirt except during the fall when organic material becomes the dominant component. The Chicago study also determined the dust and dirt accumulation rate in the streets of several test areas and related the concentrations of various pollutants to the amount of dust and dirt. This option in STORM allows the user to specify the dust and dirt accumulation in terms of weight per day per length of gutter (kgs/day/100 mi of gutter) for each land use. The pollutants are expressed as fractions of the dust and dirt for each land use. This method of pollutant accumulation should not be used where a significant portion of the pollutants come from areas other than streets nor where non-urban land uses represent a significant portion of the watershed. Use of the dust and dirt method on a non-urban watershed would require specification of ficticious street gutter densities for each land use.

The second method of pollutant accumulation is the daily pollutant accumulation method. It is to be used in watersheds where a significant portion of the pollutants are assumed to come from areas other than streets or where a significant portion of the land uses are non-urban. The method requires only average daily accumulation rates for each pollutant. Dust and dirt accumulation rates are not required. Street sweeping is not allowed with this method.

Computation of Land Surface Erosion

The universal soil-loss equation is used to calculate land surface erosion.

$$SER = EI*K*LS*C*P*SDR$$

Where

SER = land surface erosion from the subbasin in tons/acre (metric tons/hectare) for the event

EI = rainfall factor based on rainfall erosive energy

K = soil erodibility factor based on soil properties

LS = length-slope factor, a function of ground surface slope and overland flow length (L) as follows:

$LS = L \quad (.0076 + 0.0053\underline{S} + 0.00076\underline{S}^2)$, where S is ground slope in percent

C = cropping-management factor represents the character and extent of ground cover (grass, bush, trees, etc.)

P = erosion-control practice factor, intended to represent manmade erosion control practices or structures

SDR = sediment delivery ratio

APPENDIX B
PRINTOUTS

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*****************************************************
S T O R M      L7520      VERSION 2.1    AUGUST 1977
THE HYDROLOGIC ENGINEERING CENTER  DAVIS, CALIFORNIA
FOR ASSISTANCE  CALL 916-440-3286  OR 448-3286 (FTS)
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AMERICAN SAMOA PAGO PAGO HARBOR
JOB NUMBER 04430-020-11
ALL 8 SUBBASINS (EXISTING)

NWSHD	ISNO	ISED	IQUAL	IEVNT	IODWF	IDVAR	IHVAR	IHPVAR
8	0	1	0	0	0	3	3	0

NSUMR	LEXT	LINE	LDATE	LHR	NHYDRO	METRIC
30	3	0	-6	0	0	2

TITLE OF RAIN GAGE
ATU'U STATION

IN	IFILE	ISTART	IEND	IR
5	0	0	999999	1

RAINFALL DATA FOR ATU'U STATION
HOURLY RAINFALL, IN HUNDRETHS OF AN INCH

YEAR	MO	DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1999	1	1	0	0	0	0	0	30	0	0	0	0	0	10	30	10	10	20	0	0	10	0	0	10	0	0	130
1999	1	2	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	0	30
1999	1	3	0	0	0	0	10	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	30
1999	1	4	0	0	0	0	0	0	10	0	0	0	0	0	10	0	0	0	0	0	20	0	0	0	0	10	50
1999	1	5	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	1	6	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	10
1999	1	8	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	20	10	0	0	40
1999	1	11	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	1	12	0	0	0	0	0	0	0	0	0	0	10	10	0	10	0	0	0	0	0	0	0	0	0	0	30
1999	1	13	0	0	0	0	0	0	0	0	0	0	10	70	10	0	0	20	0	0	0	0	0	0	0	0	110
1999	1	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	20
1999	1	17	0	30	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
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1999	1	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10
1999	1	30	0	20	30	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	60
1999	1	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	0	20
1999	2	1	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	20
1999	2	3	0	0	0	0	0	0	0	0	0	0	50	60	10	0	0	0	0	0	0	0	20	10	0	0	150
1999	2	5	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	2	6	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	10	0	10	40
1999	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	10
1999	2	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	20	0	0	30
1999	2	9	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	2	10	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
1999	2	11	0	0	0	0	0	30	10	90	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160
1999	2	12	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	2	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	20
1999	2	18	10	0	0	10	0	0	10	0	0	0	0	0	0	50	60	20	0	0	0	0	0	0	10	0	170
1999	2	19	20	20	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	110	0	0	0	0	0	160
1999	2	20	0	0	20	0	0	0	50	80	0	10	20	0	10	0	0	20	20	50	10	0	0	0	0	0	290
1999	2	24	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	30	10	20	0	0	10	100
1999	3	2	10	0	10	70	10	30	30	40	20	0	40	80	30	60	40	50	120	80	10	20	0	0	0	0	750
1999	3	3	0	0	0	0	0	10	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	10	30
1999	3	7	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	50	210	190	20	0	500
1999	3	8	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	10	0	0	30
1999	3	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	20
1999	3	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
1999	3	15	0	10	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	10	0	0	0	30
1999	3	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	10
1999	4	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	30
1999	4	10	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	4	12	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	4	13	0	0	0	0	10	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30

RAINFALL DATA FOR ATU'U STATION
HOURLY RAINFALL, IN HUNDRETHS OF AN INCH

YEAR	MO	DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1999	4	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	10
1999	4	16	40	0	20	50	0	0	0	0	0	20	10	0	0	0	0	0	10	20	0	40	0	0	0	0	210
1999	4	17	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	4	19	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	30	20	70
1999	4	20	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	10	20	0	40
1999	4	21	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	4	22	30	70	80	20	160	70	20	10	0	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	480
1999	4	23	0	0	0	10	0	40	0	0	0	10	0	0	0	0	20	30	30	10	20	240	100	50	30	50	640
1999	4	24	0	10	60	40	20	10	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	150
1999	4	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10	0	0	0	20
1999	4	26	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	5	6	0	0	10	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	5	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	110	70	20	0	10	0	0	0	0	210
1999	5	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	30
1999	5	9	0	0	10	0	10	50	20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
1999	5	10	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	20
1999	5	11	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	5	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	120	120	30	20	0	0	300
1999	5	18	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	10	0	0	0	0	0	20	0	20	60
1999	5	19	0	10	10	0	0	0	0	0	0	0	30	0	0	0	0	0	10	0	10	50	20	10	0	40	190
1999	5	20	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
1999	5	21	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	120	20	0	0	0	0	0	0	0	150
1999	5	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
1999	5	24	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	5	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	10	10	0	40
1999	5	27	0	0	0	0	0	0	10	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	5	31	0	0	0	0	0	0	0	0	0	0	50	10	0	0	0	0	0	0	0	0	0	0	0	0	60
1999	6	1	0	0	0	0	0	0	0	0	0	0	0	0	130	10	0	0	0	0	0	50	0	0	0	0	190
1999	6	2	0	0	20	10	70	120	80	10	10	10	0	0	0	0	0	0	0	0	10	0	0	0	0	0	340
1999	6	3	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	6	11	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	6	20	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	6	24	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	20
1999	6	25	0	10	0	10	0	0	20	0	10	10	0	0	0	10	10	0	10	0	0	0	0	0	0	0	90
1999	6	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	20	40
1999	6	28	0	0	0	10	0	10	20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
1999	7	1	0	0	0	0	0	0	10	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	7	2	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	20
1999	7	3	10	30	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
1999	7	4	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
1999	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	100	190
1999	7	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	10	0	0	0	0	0	0	110
1999	7	14	0	50	40	20	0	10	10	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140
1999	7	15	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	7	16	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	7	17	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	7	18	10	0	10	30	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
1999	7	20	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	7	21	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10	20	50	0	30	30	150
1999	7	22	50	10	40	20	10	20	0	0	10	0	0	10	0	10	10	0	0	0	10	10	0	0	0	0	210

RAINFALL DATA FOR ATU'U STATION
HOURLY RAINFALL, IN HUNDRETHS OF AN INCH

YEAR	MO	DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1999	7	23	20	0	0	30	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70
1999	7	27	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	10
1999	7	28	0	0	0	20	10	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	0	0	0	0	50
1999	7	29	0	0	0	0	0	0	40	0	0	0	0	20	0	0	0	0	0	10	0	0	0	0	0	0	70
1999	7	30	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	8	3	0	0	0	0	60	170	110	40	30	30	10	0	0	0	0	0	0	0	0	0	0	0	0	0	450
1999	8	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	40	0	0	60
1999	8	6	0	0	0	0	0	0	0	0	0	0	10	0	10	20	10	0	20	0	10	10	0	0	0	0	90
1999	8	7	0	10	0	0	10	0	0	0	0	0	0	0	10	0	10	10	20	0	10	10	40	10	50	0	190
1999	8	12	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	8	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	10
1999	8	22	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	8	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10
1999	8	25	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	20
1999	8	28	0	0	0	0	40	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
1999	8	31	0	0	0	0	0	0	0	10	0	0	0	0	10	0	0	0	0	0	10	0	0	0	0	0	30
1999	9	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	50	0	60
1999	9	7	0	0	0	0	0	0	0	0	0	10	50	10	10	10	10	0	0	0	0	0	0	0	0	0	100
1999	9	8	0	10	0	0	0	10	0	30	10	10	0	0	0	0	0	0	0	0	0	10	20	50	10	20	180
1999	9	10	30	0	0	0	0	0	0	20	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70
1999	9	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	20
1999	9	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	10
1999	9	13	0	0	0	0	0	0	0	0	0	0	20	0	10	0	0	10	0	0	0	0	0	10	0	0	50
1999	9	14	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10	0	0	0	0	0	0	0	0	0	20
1999	9	15	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
1999	9	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	20
1999	9	19	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	20	10	0	0	0	0	0	0	10	80
1999	9	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	0	0	30
1999	9	22	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	9	26	0	0	0	0	0	40	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
1999	10	5	0	0	0	0	0	10	10	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	30
1999	10	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	20	0	0	0	40
1999	10	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	30	10	0	10	0	0	0	70
1999	10	8	10	0	0	0	0	10	10	0	0	0	10	10	10	10	30	10	0	20	50	30	30	50	20	0	310
1999	10	9	20	0	0	10	0	0	0	0	0	20	10	40	20	10	10	10	40	90	40	0	10	10	10	0	350
1999	10	10	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	80	30	0	0	10	170
1999	10	11	10	0	0	20	0	20	30	0	40	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	130
1999	10	12	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	10	14	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	10	16	0	10	0	0	0	0	0	0	130	0	0	0	10	0	40	0	0	0	0	0	0	0	0	0	190
1999	10	18	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
1999	10	19	0	0	0	0	0	0	0	10	0	0	10	50	10	0	10	0	0	10	0	0	0	0	0	0	100
1999	10	20	10	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	30
1999	10	26	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	10	10	30
1999	10	27	20	20	10	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
1999	11	5	0	0	0	10	0	120	10	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180
1999	11	6	0	0	0	0	0	0	0	0	0	0	0	0	20	0	10	0	0	0	0	0	0	0	0	0	30
1999	11	7	0	0	0	0	0	0	0	0	10	0	30	30	90	70	50	0	0	0	0	0	0	0	0	0	280
1999	11	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	60	0	0	80
1999	11	10	0	0	0	0	0	0	0	10	0	0	0	0	10	0	0	0	0	10	0	0	0	0	0	0	30

RAINFALL DATA FOR ATU'U STATION
HOURLY RAINFALL, IN HUNDRETHS OF AN INCH

YEAR	MO	DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1999	11	11	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	10
1999	11	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	20
1999	11	16	0	0	0	0	0	0	10	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	11	17	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	11	18	0	0	0	30	50	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
1999	11	19	50	10	0	0	0	0	0	0	0	0	20	120	70	0	0	0	0	0	0	10	10	0	0	0	290
1999	11	20	0	0	0	0	10	50	70	20	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160
1999	11	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	20
1999	11	24	0	0	10	0	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
1999	11	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	10	0	0	0	0	0	30
1999	11	27	0	0	0	10	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	11	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	10	60
1999	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
1999	12	3	10	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
1999	12	6	0	0	0	10	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	12	7	0	0	0	10	0	10	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	10	0	80
1999	12	8	0	0	0	0	0	0	0	0	0	10	0	0	60	30	0	10	0	0	0	0	0	0	0	0	110
1999	12	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	10	0	0	0	0	30
1999	12	12	0	0	0	0	0	0	10	10	0	0	20	0	0	0	0	20	10	20	20	0	0	10	0	0	120
1999	12	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	10
1999	12	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
1999	12	17	10	0	0	10	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	30
1999	12	19	0	0	0	0	0	0	0	0	0	0	0	0	0	30	60	0	0	0	0	0	0	0	0	0	90
1999	12	20	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	40
1999	12	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10
1999	12	24	0	0	10	0	0	0	0	10	0	0	0	30	60	80	0	0	0	0	0	0	10	0	0	0	200
1999	12	25	10	0	0	0	0	0	0	0	0	0	50	60	0	10	0	0	0	0	20	10	10	0	0	0	170
1999	12	26	40	0	0	0	0	0	0	0	0	10	30	20	30	40	10	20	30	10	0	0	0	0	10	0	250
1999	12	27	0	0	0	0	10	0	0	10	10	10	30	70	90	270	40	0	10	0	0	0	0	20	0	0	570
1999	12	28	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	10	0	0	40	10	10	80
1999	12	29	0	10	0	0	80	0	0	0	20	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	120
1999	12	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	10
1999	12	31	10	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20

END OF RAINFALL DATA.
183 RAINFALL DAYS PROCESSED ENCOMPASSING 371 DAYS (1 YEARS) OF RECORD.

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
FAGA'ALU	4	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
703.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	8.7	40.0	0.0	0							
NRUD	3.7	60.0	0.0	0							
UNDV	85.3	20.0	0.0	0							
AGRI	2.3	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.32415

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.2322

BASIN SOIL PROPERTIES

JOB PARAMETERS

```
MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED =   2
MAX SOIL PARAMETERS FOR EACH DEPTH                  =   2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE          =   4
MAX CHARACTERS IN SLOPE GROUP CODE                  =   2
SLOPE GROUP WEIGHTING FACTOR                        =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY     =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT        =0.33
```

SLOPE GROUP DATA

SLOPE GROUP 1;

```
  SLOPE CODE =     A
  SLOPE RANGE=15.0   30.0
```

SLOPE GROUP 2;

```
  SLOPE CODE =     A
  SLOPE RANGE=30.0   60.0
```

SLOPE GROUP 3;

```
  SLOPE CODE =     A   130
  SLOPE RANGE=70.0   ****
```

SLOPE GROUP 4;

```
  SLOPE CODE =     A
  SLOPE RANGE= 0.0   30.0
```

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

LAND SURFACE EROSION INPUT DATA FOR SUBBASIN NO@ 1

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'									
		100.000	300.000	0.000	10.000	100.000	0.000	0.280	
LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)									
R RESI	FFA	15.000	50.000	0.000	1.000	100.000	0.000	0.280	
		15.000	50.000	94.000	1.000	100.000	0.100	0.280	51.0613
R RESI	UAA	85.000	50.000	0.000	1.000	100.000	0.000	0.280	
		85.000	50.000	12.000	1.000	100.000	0.170	0.280	1.2773
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.280	
		100.000	50.000	12.000	1.000	100.000	0.170	0.280	1.2773
R UNDV	UAA	6.000	50.000	0.000	0.300	100.000	0.000	0.280	
		6.000	50.000	12.000	0.300	100.000	0.170	0.280	1.2773
R UNDV	FFA	94.000	50.000	0.000	0.300	100.000	0.000	0.280	
		94.000	50.000	94.000	0.300	100.000	0.100	0.280	51.0613
R AGRI	UAA	88.000	50.000	0.000	0.800	100.000	0.000	0.280	
		88.000	50.000	12.000	0.800	100.000	0.170	0.280	1.2773
R AGRI	FFA	12.000	50.000	0.000	0.800	100.000	0.000	0.280	
		12.000	50.000	94.000	0.800	100.000	0.100	0.280	51.0613

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	61.2	100.000	0.010	0.280
NRUD	26.0	100.000	0.002	0.280
UNDV	599.7	100.000	0.014	0.280
AGRI	16.2	100.000	0.006	0.280

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

```
                                                         ALL 8 SUBBASINS (EXISTING)
                                                          QUANTITY ANALYSIS
TREATMENT RATE  = 0.0000 IN/HR,      0.0 CFS,     0.000 MGD                                            ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES,     0.0 AC-FT,   0.000 MG                                                  FAGA'ALU

EVENT ---D A T E--- HRS NO ---RAINFALL--- RUNO OUTF HRSTO --STORAGE-- ----O V E R F L O W---- ---TREATMENT---- --AGE OF STORAGE---
      YEAR MO DY HR STORAG DRTN  HRS INCH INCH INCH EMPTY DURTN   MAX  NO  ST DUR WASTE INITL  HRS  INCH  AGE1 AGE2 AGE3 AGE4 AGE5
*****1 *********2 *3 *****4 ***5 ***6 ***7 **7A **7B ****8 ****9 ***10 *11 *12 *13 ***14 ***15 ***16 ***17 **18 **19 **20 **21 **22


AVE OF  300 EVENTS   26.3** 2.3  2.1 0.52 0.17 0.17   1.0   3.3  0.00      0.0*                   3.3  0.00  0.0  0.0  0.0  0.0  0.0
AVE OF 300 OVRFLW EVENTS    2.3  2.1 0.52 0.17 0.17   1.0   3.3  0.00*     1.0 2.1  0.17  0.12    3.3  0.00  0.0  0.0  0.0  0.0  0.0
```

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 0 DRY PERIODS

AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	50.47	FRACTION OF RAINFALL =0.32
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	50.47	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	50.47	FRACTION OF RAINFALL =0.32, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	35.75	FRACTION OF RAINFALL =0.23, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
UTULEI	3	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
180.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	41.1	40.0	0.0	0							
NRUD	23.4	60.0	0.0	0							
UNDV	35.5	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.43185

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.3758

BASIN SOIL PROPERTIES

JOB PARAMETERS

MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED = 2
MAX SOIL PARAMETERS FOR EACH DEPTH = 2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE = 4
MAX CHARACTERS IN SLOPE GROUP CODE = 2
SLOPE GROUP WEIGHTING FACTOR =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT =0.33

SLOPE GROUP DATA

SLOPE GROUP 1;

SLOPE CODE = A
SLOPE RANGE=15.0 30.0

SLOPE GROUP 2;

SLOPE CODE = A
SLOPE RANGE=30.0 60.0

SLOPE GROUP 3;

SLOPE CODE = A
SLOPE RANGE=70.0 ****

SLOPE GROUP 4;

SLOPE CODE = A
SLOPE RANGE= 0.0 30.0

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

LAND SURFACE EROSION INPUT DATA FOR SUBBASIN NO@ 2

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'									
		100.000	300.000	0.000	10.000	100.000	0.000	0.400	
LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)									
R RESI	UAA	76.000	50.000	0.000	1.000	100.000	0.000	0.400	
		76.000	50.000	12.000	1.000	100.000	0.170	0.400	1.2773
R RESI	FFA	24.000	50.000	0.000	1.000	100.000	0.000	0.400	
		24.000	50.000	94.000	1.000	100.000	0.100	0.400	51.0613
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.400	
		100.000	50.000	12.000	1.000	100.000	0.170	0.400	1.2773
R UNDV	UAA	33.000	50.000	0.000	0.300	100.000	0.000	0.400	
		33.000	50.000	12.000	0.300	100.000	0.170	0.400	1.2773
R UNDV	FFA	67.000	50.000	0.000	0.300	100.000	0.000	0.400	
		67.000	50.000	94.000	0.300	100.000	0.100	0.400	51.0613

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	74.0	100.000	0.014	0.400
NRUD	42.1	100.000	0.002	0.400
UNDV	63.9	100.000	0.010	0.400

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

PAGE 1 ALL 8 SUBBASINS (EXISTING)

QUANTITY ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD ATU'U STATION

STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG UTULEI

EVENT	---D A T E--- YEAR MO DY	HR	HRS NO STORAG	---RAINFALL--- DRTN	HRS	INCH	RUNO INCH	OUTF INCH	HRSTO EMPTY	--STORAGE-- DURTN	MAX	----O V E R F L O W---- NO	ST	DUR	WASTE	INITL	---TREATMENT---- HRS	INCH	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	*********2	*3	******4	***5	***6	***7	**7A	**7B	****8	****9	***10	*11	*12	*13	***14	***15	***16	***17	**18	**19	**20	**21	**22
AVE OF 300 EVENTS			26.3**	2.3	2.1	0.52	0.22	0.22	1.0	3.3	0.00		0.0*				3.3	0.00	0.0	0.0	0.0	0.0	0.0
AVE OF 300 OVRFLW EVENTS				2.3	2.1	0.52	0.22	0.22	1.0	3.3	0.00*		1.0	2.1	0.22	0.16	3.3	0.00	0.0	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.

**EXCLUDING 0 DRY PERIODS

AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	67.24	FRACTION OF RAINFALL =0.43
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	67.24	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	67.24	FRACTION OF RAINFALL =0.43, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	47.63	FRACTION OF RAINFALL =0.31, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	NXLG	EXPTE	REFF	TRTP	TSURC	IPACUM
FAGATOGO	3	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
219.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	34.7	40.0	0.0	0							
NRUD	11.4	60.0	0.0	0							
UNDV	53.9	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.38625

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.3150

BASIN SOIL PROPERTIES

JOB PARAMETERS

MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED = 2
MAX SOIL PARAMETERS FOR EACH DEPTH = 2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE = 4
MAX CHARACTERS IN SLOPE GROUP CODE = 2
SLOPE GROUP WEIGHTING FACTOR =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT =0.33

SLOPE GROUP DATA

SLOPE GROUP 1;

SLOPE CODE = A
SLOPE RANGE=15.0 30.0

SLOPE GROUP 2;

SLOPE CODE = A
SLOPE RANGE=30.0 60.0

SLOPE GROUP 3;

SLOPE CODE = A
SLOPE RANGE=70.0 ****

SLOPE GROUP 4;

SLOPE CODE = A
SLOPE RANGE= 0.0 30.0

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

LAND SURFACE EROSION INPUT DATA FOR SUBBASIN NO@ 3

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'									
		100.000	300.000	0.000	10.000	100.000	0.000	0.380	
LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)									
R RESI	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.380	
		100.000	50.000	12.000	1.000	100.000	0.170	0.380	1.2773
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.380	
		100.000	50.000	12.000	1.000	100.000	0.170	0.380	1.2773
R UNDV	FFA	100.000	50.000	0.000	0.300	100.000	0.000	0.380	
		100.000	50.000	94.000	0.300	100.000	0.100	0.380	51.0613

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	76.0	100.000	0.002	0.380
NRUD	25.0	100.000	0.002	0.380
UNDV	118.0	100.000	0.015	0.380

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

ALL 8 SUBBASINS (EXISTING)
QUANTITY ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG

ATU'U STATION
FAGATOGO

EVENT	---D A T E--- YEAR MO DY	HR	HRS NO STORAG	---RAINFALL--- DRTN	HRS	INCH	RUNO INCH	OUTF INCH	HRSTO EMPTY	--STORAGE-- DURTN	MAX	----O V E R F L O W---- NO	ST	DUR	WASTE	INITL	---TREATMENT---- HRS	INCH	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
***1	*********2	*3	*****4	***5	***6	***7	**7A	**7B	****8	****9	***10	*11	*12	*13	***14	***15	***16	***17	**18	**19	**20	**21	**22
AVE OF 300 EVENTS			26.3**	2.3	2.1	0.52	0.20	0.20	1.0	3.3	0.00		0.0*				3.3	0.00	0.0	0.0	0.0	0.0	0.0
AVE OF 300 OVRFLW EVENTS				2.3	2.1	0.52	0.20	0.20	1.0	3.3	0.00*		1.0	2.1	0.20	0.14	3.3	0.00	0.0	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 0 DRY PERIODS

AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	60.14	FRACTION OF RAINFALL =0.39
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	60.14	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	60.14	FRACTION OF RAINFALL =0.39, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	42.60	FRACTION OF RAINFALL =0.27, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
HAPPY VALLEY	3	2.000	0.700	0.00	0.00	2

AREA	RFU	IOU	DVU	DVUMX	WU	POPULA
119.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	29.4	40.0	0.0	0							
NRUD	8.4	60.0	0.0	0							
UNDV	62.2	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.36930

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.2924

BASIN SOIL PROPERTIES

JOB PARAMETERS

MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED = 2
MAX SOIL PARAMETERS FOR EACH DEPTH = 2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE = 4
MAX CHARACTERS IN SLOPE GROUP CODE = 2
SLOPE GROUP WEIGHTING FACTOR =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT =0.33

SLOPE GROUP DATA

SLOPE GROUP 1;

SLOPE CODE = A
SLOPE RANGE=15.0 30.0

SLOPE GROUP 2;

SLOPE CODE = A
SLOPE RANGE=30.0 60.0

SLOPE GROUP 3;

SLOPE CODE = A
SLOPE RANGE=70.0 ****

SLOPE GROUP 4;

SLOPE CODE = A
SLOPE RANGE= 0.0 30.0

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'									
		100.000	300.000	0.000	10.000	100.000	0.000	0.410	

LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)

R RESI	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.410	
		100.000	50.000	12.000	1.000	100.000	0.170	0.410	1.2773
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.410	
		100.000	50.000	12.000	1.000	100.000	0.170	0.410	1.2773
R UNDV	FFA	100.000	50.000	0.000	0.300	100.000	0.000	0.410	
		100.000	50.000	94.000	0.300	100.000	0.100	0.410	51.0613

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	35.0	100.000	0.002	0.410
NRUD	10.0	100.000	0.002	0.410
UNDV	74.0	100.000	0.015	0.410

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

```
PAGE    1                                              ALL 8 SUBBASINS (EXISTING)
                                                         QUANTITY ANALYSIS
TREATMENT RATE  = 0.0000 IN/HR,     0.0 CFS,     0.000 MGD                                                ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES,    0.0 AC-FT,   0.000 MG                                                    HAPPY VALLEY

EVENT ---D A T E--- HRS NO ---RAINFALL--- RUNO OUTF HRSTO --STORAGE-- ----O V E R F L O W---- ---TREATMENT---- --AGE OF STORAGE---
      YEAR MO DY HR STORAG DRTN  HRS INCH INCH INCH EMPTY DURTN   MAX  NO  ST DUR WASTE INITL  HRS  INCH  AGE1 AGE2 AGE3 AGE4 AGE5
****1 *********2 *3 *****4 ***5 ***6 ***7 **7A **7B ****8 ****9 ***10 *11 *12 *13 ***14 ***15 ***16 ***17 **18 **19 **20 **21 **22


AVE OF  300 EVENTS    26.3** 2.3   2.1 0.52 0.19 0.19   1.0    3.3  0.00     0.0*                 3.3  0.00  0.0  0.0  0.0  0.0  0.0
AVE OF 300 OVRFLW EVENTS     2.3   2.1 0.52 0.19 0.19   1.0    3.3  0.00*    1.0 2.1  0.19  0.14  3.3  0.00  0.0  0.0  0.0  0.0  0.0


* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING  0 DRY PERIODS
```

AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	57.50	FRACTION OF RAINFALL =0.37
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	57.50	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	57.50	FRACTION OF RAINFALL =0.37, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	40.73	FRACTION OF RAINFALL =0.26, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
PAGO PAGO	4	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
895.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	17.3	40.0	0.0	0							
NRUD	2.3	60.0	0.0	0							
UNDV	62.9	20.0	0.0	0							
AGRI	17.5	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.33285

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.2438

BASIN SOIL PROPERTIES

JOB PARAMETERS

```
MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED =   2
MAX SOIL PARAMETERS FOR EACH DEPTH                  =   2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE          =   4
MAX CHARACTERS IN SLOPE GROUP CODE                  =   2
SLOPE GROUP WEIGHTING FACTOR                        =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY     =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT        =0.33
```

SLOPE GROUP DATA

SLOPE GROUP 1;

```
  SLOPE CODE =      A
  SLOPE RANGE=15.0   30.0
```

SLOPE GROUP 2;

```
  SLOPE CODE =      A
  SLOPE RANGE=30.0   60.0
```

SLOPE GROUP 3;

```
  SLOPE CODE =      A
  SLOPE RANGE=70.0   ****
```

SLOPE GROUP 4;

```
  SLOPE CODE =      A
  SLOPE RANGE= 0.0   30.0
```

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'		100.000	300.000	0.000	10.000	100.000	0.000	0.270	

LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)

LAND USE	SOIL TYPE CODE	PALU	XLTH	SLOPE	GCOV	ECP	XK	SDR	XLS
R RESI	FFA	12.000	50.000	0.000	1.000	100.000	0.000	0.270	
		12.000	50.000	94.000	1.000	100.000	0.100	0.270	51.0613
R RESI	UAA	76.000	50.000	0.000	1.000	100.000	0.000	0.270	
		76.000	50.000	12.000	1.000	100.000	0.170	0.270	1.2773
R RESI	A2A	12.000	50.000	0.000	1.000	100.000	0.000	0.270	
		12.000	50.000	42.000	1.000	100.000	0.170	0.270	11.1075
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.270	
		100.000	50.000	12.000	1.000	100.000	0.170	0.270	1.2773
R UNDV	UAA	13.000	50.000	0.000	0.300	100.000	0.000	0.270	
		13.000	50.000	12.000	0.300	100.000	0.170	0.270	1.2773
R UNDV	FFA	74.000	50.000	0.000	0.300	100.000	0.000	0.270	
		74.000	50.000	94.000	0.300	100.000	0.100	0.270	51.0613
R UNDV	A2A	13.000	50.000	0.000	0.300	100.000	0.000	0.270	
		13.000	50.000	42.000	0.300	100.000	0.170	0.270	11.1075
R AGRI	UAA	7.000	50.000	0.000	0.800	100.000	0.000	0.270	
		7.000	50.000	12.000	0.800	100.000	0.170	0.270	1.2773
R AGRI	FFA	57.000	50.000	0.000	0.800	100.000	0.000	0.270	
		57.000	50.000	94.000	0.800	100.000	0.100	0.270	51.0613
R AGRI	A2A	36.000	50.000	0.000	0.800	100.000	0.000	0.270	
		36.000	50.000	42.000	0.800	100.000	0.170	0.270	11.1075

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	154.8	100.000	0.010	0.270
NRUD	20.6	100.000	0.002	0.270
UNDV	563.0	100.000	0.012	0.270
AGRI	156.6	100.000	0.029	0.270

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

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PAGE    1                                                ALL 8 SUBBASINS (EXISTING)
                                                          QUANTITY ANALYSIS
TREATMENT RATE  = 0.0000 IN/HR,     0.0 CFS,     0.000 MGD                                              ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES,    0.0 AC-FT,   0.000 MG                                                   PAGO PAGO

EVENT ---D A T E--- HRS NO ---RAINFALL--- RUNO OUTF HRSTO --STORAGE-- ----O V E R F L O W---- ---TREATMENT---- --AGE OF STORAGE--
      YEAR MO DY HR STORAG DRTN  HRS INCH INCH INCH EMPTY DURTN   MAX  NO  ST DUR WASTE INITL  HRS  INCH  AGE1 AGE2 AGE3 AGE4 AGE
****1 *********2 *3 *****4 ***5 ***6 ***7 **7A **7B ****8 ****9 ***10 *11 *12 *13 ***14 ***15 ***16 ***17 **18 **19 **20 **21 **2



AVE OF  300 EVENTS    26.3** 2.3  2.1 0.52 0.17 0.17   1.0   3.3  0.00     0.0*               3.3  0.00  0.0  0.0  0.0  0.0  0.
AVE OF 300 OVRFLW EVENTS     2.3  2.1 0.52 0.17 0.17   1.0   3.3  0.00*    1.0 2.1  0.17  0.12  3.3  0.00  0.0  0.0  0.0  0.0  0.

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING  0 DRY PERIODS
```

AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	51.83	FRACTION OF RAINFALL =0.33
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	51.83	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	51.82	FRACTION OF RAINFALL =0.33, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	36.71	FRACTION OF RAINFALL =0.24, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
LELOALOA	4	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
538.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	23.0	40.0	0.0	0							
NRUD	10.5	60.0	0.0	0							
UNDV	41.1	20.0	0.0	0							
AGRI	25.4	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.36600

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.2880

BASIN SOIL PROPERTIES

JOB PARAMETERS

MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED = 2
MAX SOIL PARAMETERS FOR EACH DEPTH = 2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE = 4
MAX CHARACTERS IN SLOPE GROUP CODE = 2
SLOPE GROUP WEIGHTING FACTOR =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT =0.33

SLOPE GROUP DATA

SLOPE GROUP 1;

SLOPE CODE = A
SLOPE RANGE=15.0 30.0

SLOPE GROUP 2;

SLOPE CODE = A
SLOPE RANGE=30.0 60.0

SLOPE GROUP 3;

SLOPE CODE = A
SLOPE RANGE=70.0 ****

SLOPE GROUP 4;

SLOPE CODE = A
SLOPE RANGE= 0.0 30.0

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)

DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'

		100.000	300.000	0.000	10.000	100.000	0.000	0.300	

LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)

R RESI	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.300	
		100.000	50.000	12.000	1.000	100.000	0.170	0.300	1.2773
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.300	
		100.000	50.000	12.000	1.000	100.000	0.170	0.300	1.2773
R UNDV	UAA	8.000	50.000	0.000	0.300	100.000	0.000	0.300	
		8.000	50.000	12.000	0.300	100.000	0.170	0.300	1.2773
R UNDV	FFA	92.000	50.000	0.000	0.300	100.000	0.000	0.300	
		92.000	50.000	94.000	0.300	100.000	0.100	0.300	51.0613
R AGRI	FFA	38.000	50.000	0.000	0.800	100.000	0.000	0.300	
		38.000	50.000	94.000	0.800	100.000	0.100	0.300	51.0613
R AGRI	A2A	62.000	50.000	0.000	0.800	100.000	0.000	0.300	
		62.000	50.000	42.000	0.800	100.000	0.170	0.300	11.1075

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	123.7	100.000	0.002	0.300
NRUD	56.5	100.000	0.002	0.300
UNDV	221.1	100.000	0.014	0.300
AGRI	136.7	100.000	0.025	0.300

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

```
                                                    ALL 8 SUBBASINS (EXISTING)
                                                     QUANTITY ANALYSIS
TREATMENT RATE  = 0.0000 IN/HR,     0.0 CFS,     0.000 MGD                                        ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES,    0.0 AC-FT,   0.000 MG                                              LELOALOA

EVENT ---D A T E--- HRS NO ---RAINFALL--- RUNO OUTF HRSTO --STORAGE-- ----O V E R F L O W---- ---TREATMENT---- --AGE OF STORAGE---
      YEAR MO DY HR STORAG DRTN  HRS INCH INCH INCH EMPTY DURTN   MAX  NO  ST DUR WASTE INITL  HRS  INCH  AGE1 AGE2 AGE3 AGE4 AGE5
****1 *********2 *3 *****4 ***5 ***6 ***7 **7A **7B ****8 ****9 ***10 *11 *12 *13 ***14 ***15 ***16 ***17 **18 **19 **20 **21 **22


AVE OF  300 EVENTS   26.3** 2.3  2.1 0.52 0.19 0.19   1.0   3.3  0.00     0.0*               3.3  0.00  0.0  0.0  0.0  0.0  0.0
AVE OF 300 OVRFLW EVENTS    2.3  2.1 0.52 0.19 0.19   1.0   3.3  0.00*    1.0 2.1  0.19  0.13  3.3  0.00  0.0  0.0  0.0  0.0  0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING  0 DRY PERIODS
```

AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	56.99	FRACTION OF RAINFALL =0.37
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	56.99	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	56.98	FRACTION OF RAINFALL =0.37, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	40.37	FRACTION OF RAINFALL =0.26, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
AVA	4	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
400.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	16.8	40.0	0.0	0							
NRUD	1.8	60.0	0.0	0							
UNDV	80.1	20.0	0.0	0							
AGRI	1.3	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.33060

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.2408

BASIN SOIL PROPERTIES

JOB PARAMETERS

```
MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED =    2
MAX SOIL PARAMETERS FOR EACH DEPTH                  =    2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE          =    4
MAX CHARACTERS IN SLOPE GROUP CODE                  =    2
SLOPE GROUP WEIGHTING FACTOR                        =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY     =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT        =0.33
```

SLOPE GROUP DATA

SLOPE GROUP 1;

SLOPE CODE = A
SLOPE RANGE=15.0 30.0

SLOPE GROUP 2;

SLOPE CODE = A
SLOPE RANGE=30.0 60.0

SLOPE GROUP 3;

SLOPE CODE = A
SLOPE RANGE=70.0 ****

SLOPE GROUP 4;

SLOPE CODE = A
SLOPE RANGE= 0.0 30.0

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'									
		100.000	300.000	0.000	10.000	100.000	0.000	0.320	

LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW?(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)

R RESI	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.320	
		100.000	50.000	12.000	1.000	100.000	0.170	0.320	1.2773
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.320	
		100.000	50.000	12.000	1.000	100.000	0.170	0.320	1.2773
R UNDV	A2A	67.000	50.000	0.000	0.300	100.000	0.000	0.320	
		67.000	50.000	42.000	0.300	100.000	0.170	0.320	11.1075
R UNDV	FFA	33.000	50.000	0.000	0.300	100.000	0.000	0.320	
		33.000	50.000	94.000	0.300	100.000	0.100	0.320	51.0613
R AGRI	UAA	100.000	50.000	0.000	0.800	100.000	0.000	0.320	
		100.000	50.000	12.000	0.800	100.000	0.170	0.320	1.2773

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	67.2	100.000	0.002	0.320
NRUD	7.2	100.000	0.002	0.320
UNDV	320.4	100.000	0.009	0.320
AGRI	5.2	100.000	0.002	0.320

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE
0.0000	1	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

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                                                      ALL 8 SUBBASINS (EXISTING)
                                                          QUANTITY ANALYSIS
TREATMENT RATE  = 0.0000 IN/HR,     0.0 CFS,   0.000 MGD                                              ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES,    0.0 AC-FT,   0.000 MG                                                  AUA

EVENT ---D A T E--- HRS NO ---RAINFALL--- RUNO OUTF HRSTO --STORAGE-- ----O V E R F L O W---- ---TREATMENT---- --AGE OF STORAGE---
      YEAR MO DY HR STORAG DRTN  HRS INCH INCH INCH EMPTY DURTN   MAX  NO  ST DUR WASTE INITL  HRS  INCH  AGE1 AGE2 AGE3 AGE4 AGE5
*****1 *********2 *3 *****4 ***5 ***6 ***7 **7A **7B ****8 ****9 ***10 *11 *12 *13 ***14 ***15 ***16 ***17 **18 **19 **20 **21 **22


AVE OF  300 EVENTS    26.3** 2.3  2.1 0.52 0.17 0.17   1.0   3.3  0.00     0.0*               3.3  0.00  0.0  0.0  0.0  0.0  0.0
AVE OF 300 OVRFLW EVENTS     2.3  2.1 0.52 0.17 0.17   1.0   3.3  0.00*    1.0 2.1  0.17  0.12  3.3  0.00  0.0  0.0  0.0  0.0  0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING  0 DRY PERIODS
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AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	51.47	FRACTION OF RAINFALL =0.33
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	51.47	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	51.47	FRACTION OF RAINFALL =0.33, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	36.46	FRACTION OF RAINFALL =0.23, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
ONESOSOPO	3	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
264.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH, JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	21.2	40.0	0.0	0							
UNDV	70.8	20.0	0.0	0							
AGRI	8.0	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.33180

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.2424

BASIN SOIL PROPERTIES

JOB PARAMETERS

MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED = 2
MAX SOIL PARAMETERS FOR EACH DEPTH = 2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE = 4
MAX CHARACTERS IN SLOPE GROUP CODE = 2
SLOPE GROUP WEIGHTING FACTOR =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT =0.33

SLOPE GROUP DATA

SLOPE GROUP 1;

SLOPE CODE = A
SLOPE RANGE=15.0 30.0

SLOPE GROUP 2;

SLOPE CODE = A
SLOPE RANGE=30.0 60.0

SLOPE GROUP 3;

SLOPE CODE = A
SLOPE RANGE=70.0 ****

SLOPE GROUP 4;

SLOPE CODE = A
SLOPE RANGE= 0.0 30.0

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

LAND SURFACE EROSION INPUT DATA FOR SUBBASIN NO@ 8

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'									
		100.000	300.000	0.000	10.000	100.000	0.000	0.350	
LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)									
R RESI	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.350	
		100.000	50.000	12.000	1.000	100.000	0.170	0.350	1.2773
R UNDV	A2A	19.000	50.000	0.000	0.300	100.000	0.000	0.350	
		19.000	50.000	42.000	0.300	100.000	0.170	0.350	11.1075
R UNDV	FFA	29.000	50.000	0.000	0.300	100.000	0.000	0.350	
		29.000	50.000	94.000	0.300	100.000	0.100	0.350	51.0613
R UNDV	A1A	52.000	50.000	0.000	0.300	100.000	0.000	0.350	
		52.000	50.000	21.000	0.300	100.000	0.170	0.350	3.2107
R AGRI	A2A	25.000	50.000	0.000	0.800	100.000	0.000	0.350	
		25.000	50.000	42.000	0.800	100.000	0.170	0.350	11.1075
R AGRI	FFA	75.000	50.000	0.000	0.800	100.000	0.000	0.350	
		75.000	50.000	94.000	0.800	100.000	0.100	0.350	51.0613

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	56.0	100.000	0.002	0.350
UNDV	186.9	100.000	0.006	0.350
AGRI	21.1	100.000	0.034	0.350

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

```
PAGE    1                                                   ALL 8 SUBBASINS (EXISTING)
                                                             QUANTITY ANALYSIS
TREATMENT RATE  = 0.0000 IN/HR,     0.0 CFS,     0.000 MGD                                          ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES,    0.0 AC-FT,   0.000 MG                                               ONESOSOPO

EVENT ---D A T E--- HRS NO ---RAINFALL--- RUNO OUTF HRSTO --STORAGE-- ----O V E R F L O W---- ---TREATMENT---- --AGE OF STORAGE--
      YEAR MO DY HR STORAG DRTN  HRS INCH INCH INCH EMPTY DURTN   MAX  NO  ST DUR WASTE INITL  HRS  INCH  AGE1 AGE2 AGE3 AGE4 AGE
****1 *********2 *3 *****4 ***5 ***6 ***7 **7A **7B ****8 ****9 ***10 *11 *12 *13 ***14 ***15 ***16 ***17 **18 **19 **20 **21 **2


AVE OF  300 EVENTS   26.3** 2.3  2.1 0.52 0.17 0.17   1.0   3.3  0.00     0.0*                  3.3  0.00  0.0  0.0  0.0  0.0  0.
AVE OF 300 OVRFLW EVENTS    2.3  2.1 0.52 0.17 0.17   1.0   3.3  0.00*    1.0 2.1  0.17  0.12   3.3  0.00  0.0  0.0  0.0  0.0  0.


* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING  0 DRY PERIODS
```

AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	51.66	FRACTION OF RAINFALL =0.33
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	51.66	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	51.66	FRACTION OF RAINFALL =0.33, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	36.60	FRACTION OF RAINFALL =0.24, OF RUNOFF =0.71, OF OUTFLOW =0.71

DEFINITIONS OF QUANTITY COLUMN HEADINGS

```
 1  EVENT  = SEQUENCING NUMBER.
 2  DATE   = DATE THIS EVENT BEGAN.
 3  HR     = NUMBER OF HOURS PAST MIDNIGHT THIS EVENT BEGAN.
 4  HRS NO
    STORAG = NUMBER OF HOURS SINCE END OF LAST EVENT, EXCLUDING SUMMER (MORE THAN,  720 HOURS).

 5  DRTN   =DURATION OF STORM FROM FIRST HOUR OF RAIN, TO LAST HOUR OF RAIN.
 6  HRS    = NUMBER OF HOURS IN WHICH RAINFALL OCCURRED DURING EVENT.
 7  INCH   = AMOUNT OF RAINFALL DURING THE EVENT IN INCHES.
7A  RUNO
    INCH   = SURFACE RUNOFF DURING EVENT IN INCHES.
7B  OUTF
    INCH  = TOTAL OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW).

 8  HRSTO
    EMPTY  = NUMBER OF HOURS FROM LAST RAINFALL TO END OF EVENT.
 9  DURTN  = TOTAL NUMBER OF HOURS STORAGE WAS UTILIZED.  IE, LENGTH OF THE EVENT.

10  MAX    = MAXIMUM AMOUNT OF STORAGE UTILIZED, IN INCHES.

11  NO     = OVERFLOW EVENT SEQUENCING NUMBER.
12  ST     = NUMBER OF HOURS ELAPSED BEFORE OVERFLOW STARTED.  OR, IF NO OVERFLOW, HOUR OF MAXIMUM STORAGE.
13  DUR    = NUMBER OF HOURS IN WHICH OVERFLOW OCCURED.

14  WASTE  = QUANTITY OF WATER RELEASED UNTREATED, IN INCHES.
15  INITL  = QUANTITY OF WATER RELEASED UNTREATED DURING THE FIRST  3 HOURS OF OVERFLOW.
16  HRS    = NUMBER OF HOURS WATER WAS TREATED DURING THE PRESENT EVENT AND SINCE THE PREVIOUS EVENT.
17  INCH   = QUANTITY OF WATER TREATED DURING THE EVENT AND SINCE THE PREVIOUS EVENT.
18  AGE1   = AVERAGE AGE (HOURS) OF TREATED RUNOFF.
19  AGE2   = MAXIMUM AGE (HOURS) OF STORAGE ON FIRST IN, FIRST OUT BASIS.
20  AGE3   = MAXIMUM AGE (HOURS) OF STORAGE ON FIRST IN, LAST OUT BASIS.
21  AGE4   = QUANTITY WEIGHTED AVERAGE AGE (HRS) OF STORAGE ON FIRST IN, FIRST OUT BASIS.
22  AGE5   = QUANTITY WEIGHTED AVERAGE AGE (HRS) OF STORAGE ON FIRST IN, LAST OUT BASIS.
```

ALL 8 SUBBASINS (EXISTING)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD — ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG — FAGA'ALU

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM
RESI	17.351	1061.17	0.000	297.13	0.00	0.00	297.13	
NRUD	3.964	103.10	0.000	28.87	0.00	0.00	28.87	
UNDV	26.356	15804.74	0.000	4425.31	0.00	0.00	4425.31	
AGRI	11.739	189.80	0.000	53.14	0.00	0.00	53.14	
TOTAL		17158.82	0.00	4804.44	0.00	0.00	4804.44	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (EXISTING)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD — ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG — UTULEI

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM
RESI	25.383	1877.80	0.000	751.12	0.00	0.00	751.12	
NRUD	3.964	166.96	0.000	66.78	0.00	0.00	66.78	
UNDV	19.127	1222.24	0.000	488.89	0.00	0.00	488.89	
TOTAL		3266.99	0.00	1306.80	0.00	0.00	1306.80	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (EXISTING)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG FAGATOGO

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM
RESI	3.964	301.22	0.000	114.46	0.00	0.00	114.46	
NRUD	3.964	98.96	0.000	37.60	0.00	0.00	37.60	
UNDV	27.963	3300.72	0.000	1254.28	0.00	0.00	1254.28	
TOTAL		3700.91	0.00	1406.35	0.00	0.00	1406.35	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (EXISTING)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD — ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG — PAGO PAGO

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM
RESI	18.334	2838.71	0.000	766.45	0.00	0.00	766.45	
NRUD	3.964	81.59	0.000	22.03	0.00	0.00	22.03	
UNDV	22.191	12492.65	0.000	3373.01	0.00	0.00	3373.01	
AGRI	52.652	8246.65	0.000	2226.59	0.00	0.00	2226.59	
TOTAL		23659.70	0.00	6388.07	0.00	0.00	6388.07	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (EXISTING)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG LELOALOA

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM
RESI	3.964	490.48	0.000	147.14	0.00	0.00	147.14	
NRUD	3.964	223.91	0.000	67.17	0.00	0.00	67.17	
UNDV	25.821	5709.43	0.000	1712.82	0.00	0.00	1712.82	
AGRI	45.432	6208.39	0.000	1862.51	0.00	0.00	1862.51	
TOTAL		12632.28	0.00	3789.66	0.00	0.00	3789.66	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (EXISTING)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD — ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG — AUA

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM
RESI	3.964	266.37	0.000	85.24	0.00	0.00	85.24	
NRUD	3.964	28.54	0.000	9.13	0.00	0.00	9.13	
UNDV	16.156	5176.36	0.000	1656.44	0.00	0.00	1656.44	
AGRI	3.171	16.49	0.000	5.28	0.00	0.00	5.28	
TOTAL		5487.76	0.00	1756.09	0.00	0.00	1756.09	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (EXISTING)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD

STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG

ATU'U STATION
ONESOSOFO

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM
RESI	3.964	221.85	0.000	77.65	0.00	0.00	77.65	
UNDV	11.628	2173.45	0.000	760.71	0.00	0.00	760.71	
AGRI	62.819	1326.74	0.000	464.36	0.00	0.00	464.36	
TOTAL		3722.03	0.00	1302.71	0.00	0.00	1302.71	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

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S T O R M     L7520      VERSION 2.1    AUGUST 1977
THE HYDROLOGIC ENGINEERING CENTER  DAVIS, CALIFORNIA
FOR ASSISTANCE  CALL 916-440-3286  OR 448-3286 (FTS)
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AMERICAN SAMOA PAGO PAGO HARBOR
JOB NUMBER 04430-020-11
ALL 8 SUBBASINS (FUTURE)

NWSHD	ISNO	ISED	IQUAL	IEVNT	IODWF	IDVAR	IHVAR	IHPVAR
8	0	1	0	0	0	3	3	0

NSUMR	LEXT	LINE	LDATE	LHR	NHYDRO	METRIC
30	3	0	-6	0	0	2

TITLE OF RAIN GAGE
ATU'U STATION

IN	IFILE	ISTART	IEND	IR
5	0	0	999999	1

RAINFALL DATA FOR ATU'U STATION

HOURLY RAINFALL, IN HUNDRETHS OF AN INCH

YEAR	MO	DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1999	1	1	0	0	0	0	0	30	0	0	0	0	0	10	30	10	10	20	0	0	10	0	0	10	0	0	130
1999	1	2	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	0	30
1999	1	3	0	0	0	0	10	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	30
1999	1	4	0	0	0	0	0	0	10	0	0	0	0	0	10	0	0	0	0	0	20	0	0	0	0	10	50
1999	1	5	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	1	6	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	10
1999	1	8	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	20	10	0	0	40
1999	1	11	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	1	12	0	0	0	0	0	0	0	0	0	0	10	10	0	10	0	0	0	0	0	0	0	0	0	0	30
1999	1	13	0	0	0	0	0	0	0	0	0	0	10	70	10	0	0	20	0	0	0	0	0	0	0	0	110
1999	1	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	20
1999	1	17	0	30	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
1999	1	18	10	0	20	150	10	10	10	20	0	0	0	0	0	0	0	0	20	0	0	50	0	0	10	0	310
1999	1	19	0	0	0	0	10	30	70	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140
1999	1	20	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	1	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	10	20	50
1999	1	23	0	0	0	40	0	10	0	0	30	0	0	0	10	0	0	10	0	0	0	0	0	0	0	0	100
1999	1	24	0	0	0	0	0	10	0	0	0	0	0	0	0	30	0	10	0	0	0	0	0	10	0	0	60
1999	1	25	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	1	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10
1999	1	30	0	20	30	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	60
1999	1	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	0	20
1999	2	1	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	20
1999	2	3	0	0	0	0	0	0	0	0	0	0	50	60	10	0	0	0	0	0	0	0	20	10	0	0	150
1999	2	5	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	2	6	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	10	0	10	40
1999	2	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	10
1999	2	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	20	0	0	30
1999	2	9	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	2	10	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
1999	2	11	0	0	0	0	0	30	10	90	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160
1999	2	12	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	2	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	20
1999	2	18	10	0	0	10	0	0	10	0	0	0	0	0	0	50	60	20	0	0	0	0	0	0	10	0	170
1999	2	19	20	20	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	110	0	0	0	0	0	160
1999	2	20	0	0	20	0	0	0	50	80	0	10	20	0	10	0	0	20	20	50	10	0	0	0	0	0	290
1999	2	24	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	30	10	20	0	0	10	100
1999	3	2	10	0	10	70	10	30	30	40	20	0	40	80	30	60	40	50	120	80	10	20	0	0	0	0	750
1999	3	3	0	0	0	0	0	10	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	10	30
1999	3	7	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	50	210	190	20	0	500
1999	3	8	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	10	0	0	30
1999	3	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	20
1999	3	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
1999	3	15	0	10	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	10	0	0	0	30
1999	3	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	10
1999	4	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	30
1999	4	10	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	4	12	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10

RAINFALL DATA FOR ATU'U STATION
HOURLY RAINFALL, IN HUNDRETHS OF AN INCH

YEAR	MO	DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1999	4	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	10
1999	4	16	40	0	20	50	0	0	0	0	0	20	10	0	0	0	0	0	10	20	0	40	0	0	0	0	210
1999	4	17	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	4	19	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	30	20	70
1999	4	20	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	10	20	0	40
1999	4	21	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	4	22	30	70	80	20	160	70	20	10	0	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	480
1999	4	23	0	0	0	10	0	40	0	0	0	10	0	0	0	0	20	30	30	10	20	240	100	50	30	50	640
1999	4	24	0	10	60	40	20	10	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	150
1999	4	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10	0	0	0	20
1999	4	26	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	5	6	0	0	10	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	5	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	110	70	20	0	10	0	0	0	0	210
1999	5	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	30
1999	5	9	0	0	10	0	10	50	20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
1999	5	10	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	20
1999	5	11	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	5	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	120	120	30	20	0	0	300
1999	5	18	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	10	0	0	0	0	0	20	0	20	60
1999	5	19	0	10	10	0	0	0	0	0	0	0	30	0	0	0	0	0	10	0	10	50	20	10	0	40	190
1999	5	20	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
1999	5	21	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	120	20	0	0	0	0	0	0	0	150
1999	5	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
1999	5	24	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	5	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	10	10	0	40
1999	5	27	0	0	0	0	0	0	10	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	5	31	0	0	0	0	0	0	0	0	0	0	50	10	0	0	0	0	0	0	0	0	0	0	0	0	60
1999	6	1	0	0	0	0	0	0	0	0	0	0	0	0	130	10	0	0	0	0	0	50	0	0	0	0	190
1999	6	2	0	0	20	10	70	120	80	10	10	10	0	0	0	0	0	0	0	0	10	0	0	0	0	0	340
1999	6	3	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	6	11	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	6	20	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	6	24	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	20
1999	6	25	0	10	0	10	0	0	20	0	10	10	0	0	0	10	10	0	10	0	0	0	0	0	0	0	90
1999	6	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	20	40
1999	6	28	0	0	0	10	0	10	20	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
1999	7	1	0	0	0	0	0	0	10	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	7	2	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	20
1999	7	3	10	30	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
1999	7	4	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
1999	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	100	190
1999	7	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	10	0	0	0	0	0	0	110
1999	7	14	0	50	40	20	0	10	10	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140
1999	7	15	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	7	16	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	7	17	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	7	18	10	0	10	30	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
1999	7	20	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	7	21	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10	20	50	0	30	30	150
1999	7	22	50	10	40	20	10	20	0	0	10	0	0	10	0	10	10	0	0	0	10	10	0	0	0	0	210

RAINFALL DATA FOR ATU'U STATION
HOURLY RAINFALL, IN HUNDRETHS OF AN INCH

YEAR	MO	DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1999	7	23	20	0	0	30	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70
1999	7	27	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	10
1999	7	28	0	0	0	20	10	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10	0	0	0	0	50
1999	7	29	0	0	0	0	0	0	40	0	0	0	0	20	0	0	0	0	0	10	0	0	0	0	0	0	70
1999	7	30	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	8	3	0	0	0	0	60	170	110	40	30	30	10	0	0	0	0	0	0	0	0	0	0	0	0	0	450
1999	8	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	40	0	0	60
1999	8	6	0	0	0	0	0	0	0	0	0	0	10	0	10	20	10	0	20	0	10	10	0	0	0	0	90
1999	8	7	0	10	0	0	10	0	0	0	0	0	0	0	10	0	10	10	20	0	10	10	40	10	50	0	190
1999	8	12	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	8	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	10
1999	8	22	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	8	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10
1999	8	25	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	20
1999	8	28	0	0	0	0	40	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
1999	8	31	0	0	0	0	0	0	0	10	0	0	0	0	10	0	0	0	0	0	10	0	0	0	0	0	30
1999	9	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	50	0	60
1999	9	7	0	0	0	0	0	0	0	0	0	10	50	10	10	10	10	0	0	0	0	0	0	0	0	0	100
1999	9	8	0	10	0	0	0	10	0	30	10	10	0	0	0	0	0	0	0	0	0	10	20	50	10	20	180
1999	9	10	30	0	0	0	0	0	0	20	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70
1999	9	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	20
1999	9	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	10
1999	9	13	0	0	0	0	0	0	0	0	0	0	20	0	10	0	0	10	0	0	0	0	0	10	0	0	50
1999	9	14	0	0	0	0	0	0	0	0	0	0	10	0	0	0	10	0	0	0	0	0	0	0	0	0	20
1999	9	15	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
1999	9	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	20
1999	9	19	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	20	10	0	0	0	0	0	0	10	80
1999	9	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	0	0	30
1999	9	22	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	9	26	0	0	0	0	0	40	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50
1999	10	5	0	0	0	0	0	10	10	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	30
1999	10	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	20	0	0	0	40
1999	10	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	30	10	0	10	0	0	0	70
1999	10	8	10	0	0	0	0	10	10	0	0	0	10	10	10	10	30	10	0	20	50	30	30	50	20	0	310
1999	10	9	20	0	0	10	0	0	0	0	0	20	10	40	20	10	10	10	40	90	40	0	10	10	10	0	350
1999	10	10	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	20	80	30	0	0	10	170
1999	10	11	10	0	0	20	0	20	30	0	40	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	130
1999	10	12	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	10	14	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	10	16	0	10	0	0	0	0	0	0	130	0	0	0	10	0	40	0	0	0	0	0	0	0	0	0	190
1999	10	18	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40
1999	10	19	0	0	0	0	0	0	0	10	0	0	10	50	10	0	10	0	0	10	0	0	0	0	0	0	100
1999	10	20	10	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	30
1999	10	26	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	10	10	30
1999	10	27	20	20	10	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60
1999	11	5	0	0	0	10	0	120	10	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	180
1999	11	6	0	0	0	0	0	0	0	0	0	0	0	0	20	0	10	0	0	0	0	0	0	0	0	0	30
1999	11	7	0	0	0	0	0	0	0	0	10	0	30	30	90	70	50	0	0	0	0	0	0	0	0	0	280
1999	11	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	60	0	0	80
1999	11	10	0	0	0	0	0	0	0	10	0	0	0	0	10	0	0	0	0	10	0	0	0	0	0	0	30

RAINFALL DATA FOR ATU'U STATION
HOURLY RAINFALL, IN HUNDRETHS OF AN INCH

YEAR	MO	DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL
1999	11	11	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	10
1999	11	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	20
1999	11	16	0	0	0	0	0	0	10	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	11	17	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1999	11	18	0	0	0	30	50	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
1999	11	19	50	10	0	0	0	0	0	0	0	0	20	120	70	0	0	0	0	0	0	10	10	0	0	0	290
1999	11	20	0	0	0	0	10	50	70	20	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	160
1999	11	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	20
1999	11	24	0	0	10	0	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
1999	11	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	10	0	0	0	0	0	30
1999	11	27	0	0	0	10	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	11	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	10	60
1999	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
1999	12	3	10	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
1999	12	6	0	0	0	10	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
1999	12	7	0	0	0	10	0	10	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	10	0	80
1999	12	8	0	0	0	0	0	0	0	0	0	10	0	0	60	30	0	10	0	0	0	0	0	0	0	0	110
1999	12	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	10	0	0	0	0	30
1999	12	12	0	0	0	0	0	0	10	10	0	0	20	0	0	0	0	20	10	20	20	0	0	10	0	0	120
1999	12	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	10
1999	12	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	10
1999	12	17	10	0	0	10	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	30
1999	12	19	0	0	0	0	0	0	0	0	0	0	0	0	0	30	60	0	0	0	0	0	0	0	0	0	90
1999	12	20	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	40
1999	12	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10
1999	12	24	0	0	10	0	0	0	0	10	0	0	0	30	60	80	0	0	0	0	0	0	10	0	0	0	200
1999	12	25	10	0	0	0	0	0	0	0	0	0	50	60	0	10	0	0	0	0	20	10	10	0	0	0	170
1999	12	26	40	0	0	0	0	0	0	0	0	10	30	20	30	40	10	20	30	10	0	0	0	0	10	0	250
1999	12	27	0	0	0	0	10	0	0	10	10	10	30	70	90	270	40	0	10	0	0	0	0	20	0	0	570
1999	12	28	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	10	0	0	40	10	10	80
1999	12	29	0	10	0	0	80	0	0	0	20	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	120
1999	12	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	10
1999	12	31	10	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20

END OF RAINFALL DATA.
183 RAINFALL DAYS PROCESSED ENCOMPASSING 371 DAYS (1 YEARS) OF RECORD.

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
FAGA'ALU	4	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
703.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	15.6	40.0	0.0	0							
NRUD	3.7	60.0	0.0	0							
UNDV	78.4	20.0	0.0	0							
AGRI	2.3	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.33450

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.2460

BASIN SOIL PROPERTIES

JOB PARAMETERS

```
MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED =   2
MAX SOIL PARAMETERS FOR EACH DEPTH                  =   2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE          =   4
MAX CHARACTERS IN SLOPE GROUP CODE                  =   2
SLOPE GROUP WEIGHTING FACTOR                        =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY     =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT        =0.33
```

SLOPE GROUP DATA

SLOPE GROUP 1;

```
SLOPE CODE =     A
SLOPE RANGE=15.0   30.0
```

SLOPE GROUP 2;

```
SLOPE CODE =     A
SLOPE RANGE=30.0   60.0
```

SLOPE GROUP 3;

```
SLOPE CODE =     A
SLOPE RANGE=70.0   ****
```

SLOPE GROUP 4;

```
SLOPE CODE =     A
SLOPE RANGE= 0.0   30.0
```

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

LAND SURFACE EROSION INPUT DATA FOR SUBBASIN NO@ 1

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'									
		100.000	300.000	0.000	10.000	100.000	0.000	0.280	

LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)

LAND USE	SOIL TYPE CODE	PALU	XLTH	SLOPE	GCOV	ECP	XK	SDR	XLS
R RESI	FFA	30.000	50.000	0.000	1.000	100.000	0.000	0.280	
		30.000	50.000	94.000	1.000	100.000	0.100	0.280	51.0613
R RESI	UAA	70.000	50.000	0.000	1.000	100.000	0.000	0.280	
		70.000	50.000	12.000	1.000	100.000	0.170	0.280	1.2773
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.280	
		100.000	50.000	12.000	1.000	100.000	0.170	0.280	1.2773
R UNDV	UAA	7.000	50.000	0.000	0.300	100.000	0.000	0.280	
		7.000	50.000	12.000	0.300	100.000	0.170	0.280	1.2773
R UNDV	FFA	93.000	50.000	0.000	0.300	100.000	0.000	0.280	
		93.000	50.000	94.000	0.300	100.000	0.100	0.280	51.0613
R AGRI	UAA	88.000	50.000	0.000	0.800	100.000	0.000	0.280	
		88.000	50.000	12.000	0.800	100.000	0.170	0.280	1.2773
R AGRI	FFA	12.000	50.000	0.000	0.800	100.000	0.000	0.280	
		12.000	50.000	94.000	0.800	100.000	0.100	0.280	51.0613

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	109.7	100.000	0.017	0.280
NRUD	26.0	100.000	0.002	0.280
UNDV	551.2	100.000	0.014	0.280
AGRI	16.2	100.000	0.006	0.280

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

ALL 8 SUBBASINS (FUTURE)
QUANTITY ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD

STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG

ATU'U STATION
FAGA'ALU

EVENT	---D A T E--- YEAR MO DY	HR	HRS NO STORAG	---RAINFALL--- DRTN	HRS	INCH	RUNO INCH	OUTF INCH	HRSTO EMPTY	--STORAGE-- DURTN	MAX	----O V E R F L O W---- NO	ST	DUR	WASTE	INITL	---TREATMENT---- HRS	INCH	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	*********2	*3	*****4	***5	***6	***7	**7A	**7B	****8	****9	***10	*11	*12	*13	***14	***15	***16	***17	**18	**19	**20	**21	**22
AVE OF 300 EVENTS			26.3**	2.3	2.1	0.52	0.17	0.17	1.0	3.3	0.00		0.0*				3.3	0.00	0.0	0.0	0.0	0.0	0.0
AVE OF 300 OVRFLW EVENTS				2.3	2.1	0.52	0.17	0.17	1.0	3.3	0.00*		1.0	2.1	0.17	0.12	3.3	0.00	0.0	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 0 DRY PERIODS

AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	52.08	FRACTION OF RAINFALL =0.33
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	52.08	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	52.08	FRACTION OF RAINFALL =0.33, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	36.89	FRACTION OF RAINFALL =0.24, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
UTULEI	3	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
180.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	53.3	40.0	0.0	0							
NRUD	23.4	60.0	0.0	0							
UNDV	23.3	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.45015

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.4002

BASIN SOIL PROPERTIES

JOB PARAMETERS

MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED = 2
MAX SOIL PARAMETERS FOR EACH DEPTH = 2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE = 4
MAX CHARACTERS IN SLOPE GROUP CODE = 2
SLOPE GROUP WEIGHTING FACTOR =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT =0.33

SLOPE GROUP DATA

SLOPE GROUP 1;

SLOPE CODE = A
SLOPE RANGE=15.0 30.0

SLOPE GROUP 2;

SLOPE CODE = A
SLOPE RANGE=30.0 60.0

SLOPE GROUP 3;

SLOPE CODE = A
SLOPE RANGE=70.0 ****

SLOPE GROUP 4;

SLOPE CODE = A
SLOPE RANGE= 0.0 30.0

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

LAND SURFACE EROSION INPUT DATA FOR SUBBASIN NO@ 2

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'									
		100.000	300.000	0.000	10.000	100.000	0.000	0.400	

LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)

R RESI	UAA	53.000	50.000	0.000	1.000	100.000	0.000	0.400	
		53.000	50.000	12.000	1.000	100.000	0.170	0.400	1.2773
R RESI	FFA	47.000	50.000	0.000	1.000	100.000	0.000	0.400	
		47.000	50.000	94.000	1.000	100.000	0.100	0.400	51.0613
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.400	
		100.000	50.000	12.000	1.000	100.000	0.170	0.400	1.2773
R UNDV	UAA	34.000	50.000	0.000	0.300	100.000	0.000	0.400	
		34.000	50.000	12.000	0.300	100.000	0.170	0.400	1.2773
R UNDV	FFA	66.000	50.000	0.000	0.300	100.000	0.000	0.400	
		66.000	50.000	94.000	0.300	100.000	0.100	0.400	51.0613

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	95.9	100.000	0.025	0.400
NRUD	42.1	100.000	0.002	0.400
UNDV	41.9	100.000	0.010	0.400

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

ALL 8 SUBBASINS (FUTURE)
QUANTITY ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG

ATU'U STATION
UTULEI

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EVENT ---D A T E--- HRS NO ---RAINFALL--- RUNO OUTF HRSTO --STORAGE-- ----O V E R F L O W---- ---TREATMENT---- --AGE OF STORAGE---
      YEAR MO DY HR STORAG DRTN  HRS INCH INCH INCH EMPTY DURTN   MAX  NO  ST DUR WASTE INITL  HRS  INCH  AGE1 AGE2 AGE3 AGE4 AGE5
****1 *********2 *3 *****4 ***5 ***6 ***7 **7A **7B ****8 ****9 ***10 *11 *12 *13 ***14 ***15 ***16 ***17 **18 **19 **20 **21 **22


AVE OF  300 EVENTS   26.3** 2.3  2.1 0.52 0.23 0.23   1.0   3.3  0.00     0.0*                3.3  0.00  0.0  0.0  0.0  0.0  0.0
AVE OF 300 OVRFLW EVENTS    2.3  2.1 0.52 0.23 0.23   1.0   3.3  0.00*    1.0 2.1  0.23  0.17  3.3  0.00  0.0  0.0  0.0  0.0  0.0
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* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 0 DRY PERIODS

AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS =   300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	70.09	FRACTION OF RAINFALL =0.45
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	70.09	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	70.09	FRACTION OF RAINFALL =0.45, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	49.65	FRACTION OF RAINFALL =0.32, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRIP	TSUBC	IPACUM
FAGATOGO	3	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
219.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.01	0.99	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	38.4	40.0	0.0	0							
NRUD	11.4	60.0	0.0	0							
UNDV	50.2	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.32595

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.3224

BASIN SOIL PROPERTIES

JOB PARAMETERS

MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED = 2
MAX SOIL PARAMETERS FOR EACH DEPTH = 2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE = 4
MAX CHARACTERS IN SLOPE GROUP CODE = 2
SLOPE GROUP WEIGHTING FACTOR =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT =0.33

SLOPE GROUP DATA

SLOPE GROUP 1;

SLOPE CODE = A
SLOPE RANGE=15.0 30.0

SLOPE GROUP 2;

SLOPE CODE = A
SLOPE RANGE=30.0 60.0

SLOPE GROUP 3;

SLOPE CODE = A
SLOPE RANGE=70.0 ****

SLOPE GROUP 4;

SLOPE CODE = A
SLOPE RANGE= 0.0 30.0

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

LAND SURFACE EROSION INPUT DATA FOR SUBBASIN NO@ 3

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'									
		100.000	300.000	0.000	10.000	100.000	0.000	0.380	
LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)									
R RESI	FFA	38.000	50.000	0.000	1.000	100.000	0.000	0.380	
		38.000	50.000	94.000	1.000	100.000	0.100	0.380	51.0613
R RESI	UAA	62.000	50.000	0.000	1.000	100.000	0.000	0.380	
		62.000	50.000	12.000	1.000	100.000	0.170	0.380	1.2773
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.380	
		100.000	50.000	12.000	1.000	100.000	0.170	0.380	1.2773
R UNDV	FFA	90.000	50.000	0.000	0.300	100.000	0.000	0.380	
		90.000	50.000	94.000	0.300	100.000	0.100	0.380	51.0613
R UNDV	UAA	10.000	50.000	0.000	0.300	100.000	0.000	0.380	
		10.000	50.000	12.000	0.300	100.000	0.170	0.380	1.2773

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	84.1	100.000	0.021	0.380
NRUD	25.0	100.000	0.002	0.380
UNDV	109.9	100.000	0.014	0.380

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

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                                                      ALL 8 SUBBASINS (FUTURE)
                                                      QUANTITY ANALYSIS
TREATMENT RATE  = 0.0000 IN/HR,     0.0 CFS,     0.000 MGD                                  ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES,    0.0 AC-FT,   0.000 MG                                       FAGATOGO

EVENT ---D A T E--- HRS NO ---RAINFALL--- RUNO OUTF HRSTO --STORAGE-- ----O V E R F L O W---- ---TREATMENT---- --AGE OF STORAGE---
      YEAR MO DY HR STORAG DRTN  HRS INCH INCH INCH EMPTY DURTN   MAX  NO  ST DUR WASTE INITL  HRS  INCH  AGE1 AGE2 AGE3 AGE4 AGE5
****1 *********2 *3 *****4 ***5 ***6 ***7 **7A **7B ****8 ****9 ***10 *11 *12 *13 ***14 ***15 ***16 ***17 **18 **19 **20 **21 **22


AVE OF  300 EVENTS    26.3** 2.3  2.1 0.52 0.17 0.17   1.0   3.3  0.00     0.0*              3.3  0.00  0.0  0.0  0.0  0.0  0.0
AVE OF 300 OVRFLW EVENTS     2.3  2.1 0.52 0.17 0.17   1.0   3.3  0.00*    1.0 2.1  0.17  0.12  3.3  0.00  0.0  0.0  0.0  0.0  0.0


* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING  0 DRY PERIODS
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AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	50.75	FRACTION OF RAINFALL =0.33
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	50.75	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	50.75	FRACTION OF RAINFALL =0.33, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	35.95	FRACTION OF RAINFALL =0.23, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
HAPPY VALLEY	3	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
119.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	36.1	40.0	0.0	0							
NRUD	8.4	60.0	0.0	0							
UNDV	55.5	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.37935

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.3058

BASIN SOIL PROPERTIES

JOB PARAMETERS

MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED = 2
MAX SOIL PARAMETERS FOR EACH DEPTH = 2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE = 4
MAX CHARACTERS IN SLOPE GROUP CODE = 2
SLOPE GROUP WEIGHTING FACTOR =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT =0.33

SLOPE GROUP DATA

SLOPE GROUP 1;

SLOPE CODE = A
SLOPE RANGE=15.0 30.0

SLOPE GROUP 2;

SLOPE CODE = A
SLOPE RANGE=30.0 60.0

SLOPE GROUP 3;

SLOPE CODE = A
SLOPE RANGE=70.0 ****

SLOPE GROUP 4;

SLOPE CODE = A
SLOPE RANGE= 0.0 30.0

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

LAND SURFACE EROSION INPUT DATA FOR SUBBASIN NO@ 4

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'									
		100.000	300.000	0.000	10.000	100.000	0.000	0.410	
LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)									
R RESI	FFA	25.000	50.000	0.000	1.000	100.000	0.000	0.410	
		25.000	50.000	94.000	1.000	100.000	0.100	0.410	51.0613
R RESI	UAA	75.000	50.000	0.000	1.000	100.000	0.000	0.410	
		75.000	50.000	12.000	1.000	100.000	0.170	0.410	1.2773
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.410	
		100.000	50.000	12.000	1.000	100.000	0.170	0.410	1.2773
R UNDV	FFA	100.000	50.000	0.000	0.300	100.000	0.000	0.410	
		100.000	50.000	94.000	0.300	100.000	0.100	0.410	51.0613

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	43.0	100.000	0.014	0.410
NRUD	10.0	100.000	0.002	0.410
UNDV	66.0	100.000	0.015	0.410

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

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                                                         ALL 8 SUBBASINS (FUTURE)
                                                         QUANTITY ANALYSIS
TREATMENT RATE  = 0.0000 IN/HR,     0.0 CFS,     0.000 MGD                                             ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES,    0.0 AC-FT,   0.000 MG                                                HAPPY VALLEY

EVENT ---D A T E--- HRS NO ---RAINFALL--- RUNO OUTF HRSTO --STORAGE-- ----O V E R F L O W---- ---TREATMENT---- --AGE OF STORAGE--
      YEAR MO DY HR STORAG DRTN  HRS INCH INCH INCH EMPTY DURTN   MAX  NO  ST DUR WASTE INITL  HRS  INCH  AGE1 AGE2 AGE3 AGE4 AGE
*****1 *********2 *3 *****4 ***5 ***6 ***7 **7A **7B ****8 ****9 ***10 *11 *12 *13 ***14 ***15 ***16 ***17 **18 **19 **20 **21 **2


AVE OF  300 EVENTS   26.3** 2.3  2.1 0.52 0.20 0.20   1.0   3.3  0.00     0.0*                  3.3  0.00  0.0  0.0  0.0  0.0  0.
AVE OF 300 OVRFLW EVENTS    2.3  2.1 0.52 0.20 0.20   1.0   3.3  0.00*    1.0 2.1  0.20  0.14   3.3  0.00  0.0  0.0  0.0  0.0  0.

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING  0 DRY PERIODS
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AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS =   300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	59.06	FRACTION OF RAINFALL =0.38
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	59.06	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	59.06	FRACTION OF RAINFALL =0.38, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	41.84	FRACTION OF RAINFALL =0.27, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
PAGO PAGO	4	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
895.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	25.5	40.0	0.0	0							
NRUD	2.3	60.0	0.0	0							
UNDV	59.6	20.0	0.0	0							
AGRI	12.6	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.34515

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.2602

BASIN SOIL PROPERTIES

JOB PARAMETERS

MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED = 2
MAX SOIL PARAMETERS FOR EACH DEPTH = 2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE = 4
MAX CHARACTERS IN SLOPE GROUP CODE = 2
SLOPE GROUP WEIGHTING FACTOR =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT =0.33

SLOPE GROUP DATA

SLOPE GROUP 1;

SLOPE CODE = A
SLOPE RANGE=15.0 30.0

SLOPE GROUP 2;

SLOPE CODE = A
SLOPE RANGE=30.0 60.0

SLOPE GROUP 3;

SLOPE CODE = A
SLOPE RANGE=70.0 ****

SLOPE GROUP 4;

SLOPE CODE = A
SLOPE RANGE= 0.0 30.0

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)

DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES:

		100.000	300.000	0.000	10.000	100.000	0.000	0.270	

LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW:(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)

R RESI	FFA	21.000	50.000	0.000	1.000	100.000	0.000	0.270	
		21.000	50.000	94.000	1.000	100.000	0.100	0.270	51.0613
R RESI	UAA	54.000	50.000	0.000	1.000	100.000	0.000	0.270	
		54.000	50.000	12.000	1.000	100.000	0.170	0.270	1.2773
R RESI	A2A	25.000	50.000	0.000	1.000	100.000	0.000	0.270	
		25.000	50.000	42.000	1.000	100.000	0.170	0.270	11.1075
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.270	
		100.000	50.000	12.000	1.000	100.000	0.170	0.270	1.2773
R UNDV	UAA	4.000	50.000	0.000	0.300	100.000	0.000	0.270	
		4.000	50.000	12.000	0.300	100.000	0.170	0.270	1.2773
R UNDV	FFA	81.000	50.000	0.000	0.300	100.000	0.000	0.270	
		81.000	50.000	94.000	0.300	100.000	0.100	0.270	51.0613
R UNDV	A2A	15.000	50.000	0.000	0.300	100.000	0.000	0.270	
		15.000	50.000	42.000	0.300	100.000	0.170	0.270	11.1075
R AGRI	UAA	10.000	50.000	0.000	0.800	100.000	0.000	0.270	
		10.000	50.000	12.000	0.800	100.000	0.170	0.270	1.2773
R AGRI	FFA	44.000	50.000	0.000	0.800	100.000	0.000	0.270	
		44.000	50.000	94.000	0.800	100.000	0.100	0.270	51.0613
R AGRI	A2A	46.000	50.000	0.000	0.800	100.000	0.000	0.270	
		46.000	50.000	42.000	0.800	100.000	0.170	0.270	11.1075

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	228.2	100.000	0.017	0.270
NRUD	20.6	100.000	0.002	0.270
UNDV	533.4	100.000	0.013	0.270
AGRI	112.8	100.000	0.025	0.270

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

```
                                                            ALL 8 SUBBASINS (FUTURE)
                                                            QUANTITY ANALYSIS
TREATMENT RATE  = 0.0000 IN/HR,     0.0 CFS,     0.000 MGD                                        ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES,    0.0 AC-FT,   0.000 MG                                             PAGO PAGO

EVENT ---D A T E--- HRS NO ---RAINFALL--- RUNO OUTF HRSTO --STORAGE-- ----O V E R F L O W---- ---TREATMENT---- --AGE OF STORAGE--
      YEAR MO DY HR STORAG DRTN  HRS INCH INCH INCH EMPTY DURTN   MAX  NO  ST DUR WASTE INITL  HRS  INCH  AGE1 AGE2 AGE3 AGE4 AGE
****1 *********2 *3 *****4 ***5 ***6 ***7 **7A **7B ****8 ****9 ***10 *11 *12 *13 ***14 ***15 ***16 ***17 **18 **19 **20 **21 **


AVE OF  300 EVENTS   26.3** 2.3  2.1 0.52 0.18 0.18   1.0   3.3  0.00     0.0*                   3.3  0.00  0.0  0.0  0.0  0.0  0.
AVE OF 300 OVRFLW EVENTS    2.3  2.1 0.52 0.18 0.18   1.0   3.3  0.00*    1.0 2.1  0.18  0.13   3.3  0.00  0.0  0.0  0.0  0.0  0.

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING  0 DRY PERIODS
```

AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	53.74	FRACTION OF RAINFALL =0.35
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	53.74	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	53.74	FRACTION OF RAINFALL =0.35, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	38.07	FRACTION OF RAINFALL =0.24, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSURC	IPACUM
LELOALOA	4	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
538.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMFN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	22.3	40.0	0.0	0							
NRUD	13.6	60.0	0.0	0							
UNDV	41.1	20.0	0.0	0							
AGRI	23.0	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.37425

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.2990

BASIN SOIL PROPERTIES

JOB PARAMETERS

```
MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED =   2
MAX SOIL PARAMETERS FOR EACH DEPTH                  =   2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE          =   4
MAX CHARACTERS IN SLOPE GROUP CODE                  =   2
SLOPE GROUP WEIGHTING FACTOR                        =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY     =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT        =0.33
```

SLOPE GROUP DATA

SLOPE GROUP 1;

```
  SLOPE CODE =     A
  SLOPE RANGE=15.0   30.0
```

SLOPE GROUP 2;

```
  SLOPE CODE =     A
  SLOPE RANGE=30.0   60.0
```

SLOPE GROUP 3;

```
  SLOPE CODE =     A
  SLOPE RANGE=70.0   ****
```

SLOPE GROUP 4;

```
  SLOPE CODE =     A
  SLOPE RANGE= 0.0   30.0
```

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'									
		100.000	300.000	0.000	10.000	100.000	0.000	0.300	
LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)									
R RESI	A2A	22.000	50.000	0.000	1.000	100.000	0.000	0.300	
		22.000	50.000	42.000	1.000	100.000	0.170	0.300	11.1075
R RESI	UAA	78.000	50.000	0.000	1.000	100.000	0.000	0.300	
		78.000	50.000	12.000	1.000	100.000	0.170	0.300	1.2773
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.300	
		100.000	50.000	12.000	1.000	100.000	0.170	0.300	1.2773
R UNDV	UAA	8.000	50.000	0.000	0.300	100.000	0.000	0.300	
		8.000	50.000	12.000	0.300	100.000	0.170	0.300	1.2773
R UNDV	FFA	92.000	50.000	0.000	0.300	100.000	0.000	0.300	
		92.000	50.000	94.000	0.300	100.000	0.100	0.300	51.0613
R AGRI	FFA	52.000	50.000	0.000	0.800	100.000	0.000	0.300	
		52.000	50.000	94.000	0.800	100.000	0.100	0.300	51.0613
R AGRI	A2A	48.000	50.000	0.000	0.800	100.000	0.000	0.300	
		48.000	50.000	42.000	0.800	100.000	0.170	0.300	11.1075

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	120.0	100.000	0.006	0.300
NRUD	73.2	100.000	0.002	0.300
UNDV	221.1	100.000	0.014	0.300
AGRI	123.7	100.000	0.028	0.300

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFL[
0.0000	1	0	0	0	0	0	0	(

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

```
                                                     ALL 8 SUBBASINS (FUTURE)
                                                     QUANTITY ANALYSIS
TREATMENT RATE  = 0.0000 IN/HR,     0.0 CFS,     0.000 MGD                                  ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES,    0.0 AC-FT,   0.000 MG                                        LELOALOA

EVENT ---D A T E--- HRS NO ---RAINFALL--- RUNO OUTF HRSTO --STORAGE-- ----O V E R F L O W---- ---TREATMENT---- --AGE OF STORAGE---
      YEAR MO DY HR STORAG DRTN  HRS INCH INCH INCH EMPTY DURTN   MAX  NO  ST DUR WASTE INITL  HRS  INCH  AGE1 AGE2 AGE3 AGE4 AGE5
****1 *********2 *3 *****4 ***5 ***6 ***7 **7A **7B ****8 ****9 ***10 *11 *12 *13 ***14 ***15 ***16 ***17 **18 **19 **20 **21 **22


AVE OF  300 EVENTS   26.3** 2.3  2.1 0.52 0.19 0.19   1.0   3.3  0.00     0.0*                  3.3  0.00  0.0  0.0  0.0  0.0  0.0
AVE OF 300 OVRFLW EVENTS    2.3  2.1 0.52 0.19 0.19   1.0   3.3  0.00*    1.0 2.1  0.19  0.14   3.3  0.00  0.0  0.0  0.0  0.0  0.0


* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING  0 DRY PERIODS
```

AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	58.27	FRACTION OF RAINFALL =0.37
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	58.27	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	58.27	FRACTION OF RAINFALL =0.37, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	41.28	FRACTION OF RAINFALL =0.27, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
AUA	3	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
400.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	18.1	40.0	0.0	0							
NRUD	1.8	60.0	0.0	0							
UNDV	80.1	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.33255

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.2434

BASIN SOIL PROPERTIES

JOB PARAMETERS

MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED = 2
MAX SOIL PARAMETERS FOR EACH DEPTH = 2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE = 4
MAX CHARACTERS IN SLOPE GROUP CODE = 2
SLOPE GROUP WEIGHTING FACTOR =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT =0.33

SLOPE GROUP DATA

SLOPE GROUP 1;

SLOPE CODE = A
SLOPE RANGE=15.0 30.0

SLOPE GROUP 2;

SLOPE CODE = A
SLOPE RANGE=30.0 60.0

SLOPE GROUP 3;

SLOPE CODE = A
SLOPE RANGE=70.0 ****

SLOPE GROUP 4;

SLOPE CODE = A
SLOPE RANGE= 0.0 30.0

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

LAND SURFACE EROSION INPUT DATA FOR SUBBASIN NO@ 7

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES*									
		100.000	300.000	0.000	10.000	100.000	0.000	0.320	

LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)

LAND USE	SOIL TYPE CODE	PALU	XLTH	SLOPE	GCOV	ECP	XK	SDR	XLS
R RESI	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.320	
		100.000	50.000	12.000	1.000	100.000	0.170	0.320	1.2773
R NRUD	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.320	
		100.000	50.000	12.000	1.000	100.000	0.170	0.320	1.2773
R UNDV	A2A	67.000	50.000	0.000	0.300	100.000	0.000	0.320	
		67.000	50.000	42.000	0.300	100.000	0.170	0.320	11.1075
R UNDV	FFA	33.000	50.000	0.000	0.300	100.000	0.000	0.320	
		33.000	50.000	94.000	0.300	100.000	0.100	0.320	51.0613

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	72.4	100.000	0.002	0.320
NRUD	7.2	100.000	0.002	0.320
UNDV	320.4	100.000	0.009	0.320

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

ALL 8 SUBBASINS (FUTURE)
QUANTITY ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD — ATU'U STATION

STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG — AUA

EVENT	---D A T E--- YEAR MO DY HR	HRS STORAG	NO DRTN	---RAINFALL--- HRS	INCH	RUNO INCH	OUTF INCH	HRSTO EMPTY	--STORAGE-- DURTN	MAX	----O V E R F L O W---- NO	ST	DUR	WASTE	INITL	---TREATMENT--- HRS	INCH	--AGE OF STORAGE--- AGE1	AGE2	AGE3	AGE4	AGE5
****1	*********2 *3	*****4	***5	***6	***7	**7A	**7B	****8	****9	***10	*11	*12	*13	***14	***15	***16	***17	**18	**19	**20	**21	**22
AVE OF 300 EVENTS		26.3**	2.3	2.1	0.52	0.17	0.17	1.0	3.3	0.00		0.0*				3.3	0.00	0.0	0.0	0.0	0.0	0.0
AVE OF 300 OVRFLW EVENTS			2.3	2.1	0.52	0.17	0.17	1.0	3.3	0.00*		1.0	2.1	0.17	0.12	3.3	0.00	0.0	0.0	0.0	0.0	0.0

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING 0 DRY PERIODS

AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	51.78	FRACTION OF RAINFALL =0.33
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	51.78	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	51.78	FRACTION OF RAINFALL =0.33, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	36.68	FRACTION OF RAINFALL =0.24, OF RUNOFF =0.71, OF OUTFLOW =0.71

WATERSHED DATA

NAMEWS	MXLG	EXPTE	REFF	TRTP	TSUBC	IPACUM
ONESOSOPO	3	2.000	0.700	0.00	0.00	2

AREA	RFU	IQU	DVU	DVUMX	WU	POPULA
264.00	1.00	0	0.00	0.00	0.00	0.

DAILY EVAPORATION RATES FOR EACH MONTH,JAN-DEC IN INCHES/DAY
0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

LOSSEQ	CPERV	CIMP	DEPRESSION STORAGE (INCHES)	EERC	EPRC
1	0.15	0.90	0.00	0.0	0.0

INPUT DATA DESCRIBING LAND USE AND POLLUTANTS

LNDUSE	PRCNT	FIMP	STLEN	NCLEAN	DD	POUNDS POLLUTANT PER ACRE PER DAY					BMPN/ACRE/DAY
						SUSP	SETL	BOD	N	PO4	COLI
RESI	21.2	40.0	0.0	0							
UNDV	70.8	20.0	0.0	0							
AGRI	8.0	20.0	0.0	0							

COMPUTED RUNOFF COEFFICIENT FOR WATERSHED IS0.33180

FRACTION OF WATERSHED THAT IS IMPERVIOUS IS0.2424

BASIN SOIL PROPERTIES

JOB PARAMETERS

```
MAX DEPTHS FOR WHICH SOIL PROPERTIES ARE IDENTIFIED =   2
MAX SOIL PARAMETERS FOR EACH DEPTH                  =   2
MAX CHARACTERS IN SOIL CLASSIFICATION CODE          =   4
MAX CHARACTERS IN SLOPE GROUP CODE                  =   2
SLOPE GROUP WEIGHTING FACTOR                        =0.40
RATIO OF HOURLY TO 30-MINUTE RAINFALL INTENSITY     =0.63
ENERGY REDUCTION COEFFICIENT DUE TO SNOWMELT        =0.33
```

SLOPE GROUP DATA

SLOPE GROUP 1;

```
  SLOPE CODE =     A
  SLOPE RANGE=15.0   30.0
```

SLOPE GROUP 2;

```
  SLOPE CODE =     A
  SLOPE RANGE=30.0   60.0
```

SLOPE GROUP 3;

```
  SLOPE CODE =     A
  SLOPE RANGE=70.0   ****
```

SLOPE GROUP 4;

```
  SLOPE CODE =     A
  SLOPE RANGE= 0.0   30.0
```

SOIL PROPERTIES

SOIL TYPE	SLOPE GROUP	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH	DEPTH (IN)	K AT DEPTH
A1	1	18.0	0.17	60.0	0.15	0.0	0.00
A2	2	18.0	0.17	60.0	0.15	0.0	0.00
FF	3	29.0	0.10	0.0	0.00	0.0	0.00
UA	4	60.0	0.17	0.0	0.00	0.0	0.00

LAND SURFACE EROSION INPUT DATA FOR SUBBASIN NO@ 8

SEDIMENT TRAP EFFICIENCY= 0.0 PERCENT

LAND USE	SOIL TYPE CODE	SAMPLE SIZE PERCENT (PALU)	OVERLAND FLOW DISTANCE FT (XLTH)	GROUND SLOPE PERCENT (SLOPE)	GROUND COVER FACTOR PERCENT (GCOV)	EROSION CONTROL FACTOR PERCENT (ECP)	SOIL ERODIBILITY FACTOR HR/FT (XK)	SEDIMENT DELIVERY RATIO FRACTION (SDR)	COMPUTED LENGTH-SLOPE FACTOR (XLS)
DEFAULT VALUES FOR UNIVERSAL SOIL LOSS EQUATION VARIABLES'									
		100.000	300.000	0.000	10.000	100.000	0.000	0.350	

LAND USE DATA READ FROM EACH R-CARD IS MERGED WITH SOIL PROPERTIES AND EROSION DEFAULT VALUES AS SHOWN BELOW@(1ST LINE = CARD AS READ,2ND LINE = VALUES USED IN COMPUTATIONS)

R RESI	UAA	100.000	50.000	0.000	1.000	100.000	0.000	0.350	
		100.000	50.000	12.000	1.000	100.000	0.170	0.350	1.2773
R UNDV	A2A	19.000	50.000	0.000	0.300	100.000	0.000	0.350	
		19.000	50.000	42.000	0.300	100.000	0.170	0.350	11.1075
R UNDV	FFA	29.000	50.000	0.000	0.300	100.000	0.000	0.350	
		29.000	50.000	94.000	0.300	100.000	0.100	0.350	51.0613
R UNDV	A1A	52.000	50.000	0.000	0.300	100.000	0.000	0.350	
		52.000	50.000	21.000	0.300	100.000	0.170	0.350	3.2107
R AGRI	A2A	25.000	50.000	0.000	0.800	100.000	0.000	0.350	
		25.000	50.000	42.000	0.800	100.000	0.170	0.350	11.1075
R AGRI	FFA	75.000	50.000	0.000	0.800	100.000	0.000	0.350	
		75.000	50.000	94.000	0.800	100.000	0.100	0.350	51.0613

END OF LAND USE AND SOIL EROSION DATA

AVE LAND SURF EROSION AND SEDIMENT DELIVERY

LAND USE	AREA IN ACRES	PERCENT OF AREA SAMPLED	POTENTIAL LAND SURF EROSION HR/FT	SEDIMENT DELIVERY RATIO FRACTION
RESI	56.0	100.000	0.002	0.350
UNDV	186.9	100.000	0.006	0.350
AGRI	21.1	100.000	0.034	0.350

1 TREATMENT RATE(S) WILL BE INVESTIGATED

TREATMENT RATE	NO. OF STORAGES	NO. OF POLLUTOGRAPHS	PLOT	PRINT	IPRTS	IERDMX	IAGE	IFLO
0.0000	1	0	0	0	0	0	0	0

STORAGES TO BE USED WITH ABOVE TREATMENT RATE 0.000

```
PAGE    1                                           ALL 8 SUBBASINS (FUTURE)
                                                    QUANTITY ANALYSIS
TREATMENT RATE  = 0.0000 IN/HR,     0.0 CFS,     0.000 MGD                                          ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES,    0.0 AC-FT,   0.000 MG                                              ONESOSOFO

EVENT ---D A T E--- HRS NO ---RAINFALL--- RUNO OUTF HRSTO --STORAGE-- ----O V E R F L O W---- ---TREATMENT---- --AGE OF STORAGE-
      YEAR MO DY HR STORAG DRTN  HRS INCH INCH INCH EMPTY DURTN   MAX  NO  ST DUR WASTE INITL  HRS  INCH  AGE1 AGE2 AGE3 AGE4 A(
****1 *********2 *3 *****4 ***5 ***6 ***7 **7A **7B ****8 ****9 ***10 *11 *12 *13 ***14 ***15 ***16 ***17 **18 **19 **20 **21 **


AVE OF  300 EVENTS   26.3** 2.3  2.1 0.52 0.17 0.17   1.0   3.3  0.00     0.0*                 3.3  0.00  0.0  0.0  0.0  0.0  (
AVE OF 300 OVRFLW EVENTS    2.3  2.1 0.52 0.17 0.17   1.0   3.3  0.00*    1.0 2.1   0.17  0.12   3.3  0.00  0.0  0.0  0.0  0.0  (

* NON-OVERFLOW EVENTS ONLY.
**EXCLUDING  0 DRY PERIODS
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AVERAGE ANNUAL STATISTICS FOR 1 YEARS OF RECORD FOR THE PERIOD BEGINNING 990101 AND ENDING 991231

NUMBER OF EVENTS = 300.0

NUMBER OF OVERFLOWS = 300.0

	INCHES	
PRECIPITATION ON WATERSHED	155.70	
SURFACE RUNOFF FROM WATERSHED	51.66	FRACTION OF RAINFALL =0.33
OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW)	51.66	
DRY WEATHER FLOW DURING TIMES OF RUNOFF OR STORAGE	0.00	FRACTION OF OUTFLOW =0.00
OVERFLOW TO RECEIVING WATER	51.66	FRACTION OF RAINFALL =0.33, OF RUNOFF =1.00, OF OUTFLOW =1.00
INITIAL OVERFLOW TO RECEIVING WATER	36.60	FRACTION OF RAINFALL =0.24, OF RUNOFF =0.71, OF OUTFLOW =0.71

DEFINITIONS OF QUANTITY COLUMN HEADINGS

1 EVENT = SEQUENCING NUMBER.
2 DATE = DATE THIS EVENT BEGAN.
3 HR = NUMBER OF HOURS PAST MIDNIGHT THIS EVENT BEGAN.
4 HRS NO
STORAG = NUMBER OF HOURS SINCE END OF LAST EVENT, EXCLUDING SUMMER (MORE THAN, 720 HOURS).

5 DRTN =DURATION OF STORM FROM FIRST HOUR OF RAIN, TO LAST HOUR OF RAIN.
6 HRS = NUMBER OF HOURS IN WHICH RAINFALL OCCURRED DURING EVENT.
7 INCH = AMOUNT OF RAINFALL DURING THE EVENT IN INCHES.
7A RUNO
INCH = SURFACE RUNOFF DURING EVENT IN INCHES.
7B OUTF
INCH = TOTAL OUTFLOW (SURFACE RUNOFF + DRY WEATHER FLOW).

8 HRSTO
EMPTY = NUMBER OF HOURS FROM LAST RAINFALL TO END OF EVENT.
9 DURTN = TOTAL NUMBER OF HOURS STORAGE WAS UTILIZED. IE, LENGTH OF THE EVENT.

10 MAX = MAXIMUM AMOUNT OF STORAGE UTILIZED, IN INCHES.

11 NO = OVERFLOW EVENT SEQUENCING NUMBER.
12 ST = NUMBER OF HOURS ELAPSED BEFORE OVERFLOW STARTED. OR, IF NO OVERFLOW, HOUR OF MAXIMUM STORAGE.
13 DUR = NUMBER OF HOURS IN WHICH OVERFLOW OCCURED.

14 WASTE = QUANTITY OF WATER RELEASED UNTREATED, IN INCHES.
15 INITL = QUANTITY OF WATER RELEASED UNTREATED DURING THE FIRST 3 HOURS OF OVERFLOW.
16 HRS = NUMBER OF HOURS WATER WAS TREATED DURING THE PRESENT EVENT AND SINCE THE PREVIOUS EVENT.
17 INCH = QUANTITY OF WATER TREATED DURING THE EVENT AND SINCE THE PREVIOUS EVENT.
18 AGE1 = AVERAGE AGE (HOURS) OF TREATED RUNOFF.
19 AGE2 = MAXIMUM AGE (HOURS) OF STORAGE ON FIRST IN, FIRST OUT BASIS.
20 AGE3 = MAXIMUM AGE (HOURS) OF STORAGE ON FIRST IN, LAST OUT BASIS.
21 AGE4 = QUANTITY WEIGHTED AVERAGE AGE (HRS) OF STORAGE ON FIRST IN, FIRST OUT BASIS.
22 AGE5 = QUANTITY WEIGHTED AVERAGE AGE (HRS) OF STORAGE ON FIRST IN, LAST OUT BASIS.

ALL 8 SUBBASINS (FUTURE)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD — ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG — FAGA'ALU

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM
RESI	30.737	3370.89	0.000	943.85	0.00	0.00	943.85	
NRUD	3.964	103.10	0.000	28.87	0.00	0.00	28.87	
UNDV	26.088	14378.69	0.000	4026.04	0.00	0.00	4026.04	
AGRI	11.739	189.80	0.000	53.14	0.00	0.00	53.14	
TOTAL		18042.49	0.00	5051.90	0.00	0.00	5051.90	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (FUTURE)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG UTULEI

LAND USE	LAND SURFACE EROSION		WASH-OFF FROM IMPERVIOUS AREA,	DELIVERED TO CHANNEL	DEPOSITED ON IMPERVIOUS AREA	DEPOSITED IN SEDIMENT TRAP,	OUTFLOW FROM STUDY AREA	
	TONS/ACRE	TONS	TONS	TONS	TONS	TONS	TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION		WASH-OFF FROM IMPERVIOUS AREA,	DELIVERED TO CHANNEL	DEPOSITED ON IMPERVIOUS AREA	DEPOSITED IN SEDIMENT TRAP,	OUTFLOW FROM STUDY AREA	
	TONS/ACRE	TONS	TONS	TONS	TONS	TONS	TONS	PPM
RESI	45.909	4404.50	0.000	1761.80	0.00	0.00	1761.80	
NRUD	3.964	166.96	0.000	66.78	0.00	0.00	66.78	
UNDV	18.860	790.97	0.000	316.39	0.00	0.00	316.39	
TOTAL		5362.43	0.00	2144.97	0.00	0.00	2144.97	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (FUTURE)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG FAGATOGO

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM
RESI	37.877	3185.29	0.000	1210.41	0.00	0.00	1210.41	
NRUD	3.964	98.96	0.000	37.60	0.00	0.00	37.60	
UNDV	25.285	2779.81	0.000	1056.33	0.00	0.00	1056.33	
TOTAL		6064.04	0.00	2304.34	0.00	0.00	2304.34	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (FUTURE)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD — ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG — HAPPY VALLEY

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM
RESI	26.275	1128.75	0.000	462.79	0.00	0.00	462.79	
NRUD	3.964	39.62	0.000	16.25	0.00	0.00	16.25	
UNDV	27.963	1846.79	0.000	757.18	0.00	0.00	757.18	
TOTAL		3015.16	0.00	1236.22	0.00	0.00	1236.22	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (FUTURE)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD — ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG — PAGO PAGO

LAND USE	LAND SURFACE EROSION TONS/ACRE	LAND SURFACE EROSION TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	OUTFLOW FROM STUDY AREA PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	LAND SURFACE EROSION TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	OUTFLOW FROM STUDY AREA PPM
RESI	30.331	6922.42	0.000	1869.05	0.00	0.00	1869.05	
NRUD	3.964	81.59	0.000	22.03	0.00	0.00	22.03	
UNDV	24.248	12934.54	0.000	3492.32	0.00	0.00	3492.32	
AGRI	45.811	5166.13	0.000	1394.85	0.00	0.00	1394.85	
TOTAL		25104.76	0.00	6778.25	0.00	0.00	6778.25	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (FUTURE)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD — ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG — LELOALOA

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM
RESI	10.675	1280.72	0.000	384.22	0.00	0.00	384.22	
NRUD	3.964	290.02	0.000	87.01	0.00	0.00	87.01	
UNDV	25.821	5709.43	0.000	1712.82	0.00	0.00	1712.82	
AGRI	52.011	6435.84	0.000	1930.75	0.00	0.00	1930.75	
TOTAL		13715.97	0.00	4114.81	0.00	0.00	4114.81	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (FUTURE)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG AUA

LAND USE	LAND SURFACE EROSION		WASH-OFF FROM IMPERVIOUS AREA,	DELIVERED TO CHANNEL	DEPOSITED ON IMPERVIOUS AREA	DEPOSITED IN SEDIMENT TRAP,	OUTFLOW FROM STUDY AREA	
	TONS/ACRE	TONS	TONS	TONS	TONS	TONS	TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION		WASH-OFF FROM IMPERVIOUS AREA,	DELIVERED TO CHANNEL	DEPOSITED ON IMPERVIOUS AREA	DEPOSITED IN SEDIMENT TRAP,	OUTFLOW FROM STUDY AREA	
	TONS/ACRE	TONS	TONS	TONS	TONS	TONS	TONS	PPM
RESI	3.964	286.98	0.000	91.83	0.00	0.00	91.83	
NRUD	3.964	28.54	0.000	9.13	0.00	0.00	9.13	
UNDV	16.156	5176.36	0.000	1656.44	0.00	0.00	1656.44	
TOTAL		5491.88	0.00	1757.41	0.00	0.00	1757.41	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE

ALL 8 SUBBASINS (FUTURE)
LAND SURFACE EROSION ANALYSIS

TREATMENT RATE = 0.0000 IN/HR, 0.0 CFS, 0.000 MGD — ATU'U STATION
STORAGE CAPACITY= 0.0000 INCHES, 0.0 AC-FT, 0.000 MG — ONESOSOFO

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM

AVERAGE ANNUAL SEDIMENT YIELD FOR PERIOD OF RECORD STUDIED

LAND USE	LAND SURFACE EROSION TONS/ACRE	TONS	WASH-OFF FROM IMPERVIOUS AREA, TONS	DELIVERED TO CHANNEL TONS	DEPOSITED ON IMPERVIOUS AREA TONS	DEPOSITED IN SEDIMENT TRAP, TONS	OUTFLOW FROM STUDY AREA TONS	PPM
RESI	3.964	221.85	0.000	77.65	0.00	0.00	77.65	
UNDV	11.628	2173.45	0.000	760.71	0.00	0.00	760.71	
AGRI	62.819	1326.74	0.000	464.36	0.00	0.00	464.36	
TOTAL		3722.03	0.00	1302.71	0.00	0.00	1302.71	

AVERAGE ANNUAL RAINFALL AND SNOWMELT ENERGY = 1825.43 HUNDRED FOOT-TONS/ACRE
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APPENDIX C
EXTRAPOLATED POLLUTANTS

Table 1
Existing conditions

BASIN	LAND USE TYPE	TSS Loading (STORM Model) (tons/yr)	Nitrogen (tons/yr)	Orthophosphate (tons/yr)	BOD5 (tons/yr)
Faga'alu	Undeveloped	4425.31	44.8431	2.9502	88.5062
	Agricultural	53.14	0.3130	0.0217	0.8496
	Residential	297.13	1.7856	1.4285	9.2853
	Urban	28.87	0.0680	0.0109	0.5926
	Sub-total	4804.45	47.0097	4.4113	99.2338
Utulei	Undeveloped	488.89	4.9541	0.3259	9.7778
	Agricultural	0.00	0.0000	0.0000	0.0000
	Residential	751.12	4.5139	3.6112	23.4725
	Urban	66.78	0.1572	0.0252	1.3708
	Sub-total	1306.79	9.6252	3.9622	34.6211
Fagatogo	Undeveloped	1254.28	12.7100	0.8362	25.0856
	Agricultural	0.00	0.0000	0.0000	0.0000
	Residential	114.46	0.6879	0.5503	3.5769
	Urban	37.60	0.0885	0.0142	0.7718
	Sub-total	1406.34	13.4864	1.4006	29.4343
Happy Valley	Undeveloped	848.59	8.5990	0.5657	16.9718
	Agricultural	0.00	0.0000	0.0000	0.0000
	Residential	56.86	0.3417	0.2734	1.7769
	Urban	16.25	0.0383	0.0061	0.3336
	Sub-total	921.70	8.9790	0.8452	19.0822
Pago Pago	Undeveloped	3373.01	34.1798	2.2487	67.4602
	Agricultural	2226.59	13.1139	0.9111	35.5994
	Residential	766.45	4.6061	3.6849	23.9516
	Urban	22.03	0.0519	0.0083	0.4522
	Sub-total	6388.08	51.9516	6.8530	127.4634
Leloaloa	Undeveloped	1712.82	17.3566	1.1419	34.2564
	Agricultural	1862.51	10.9696	0.7622	29.7784
	Residential	147.14	0.8843	0.7074	4.5981
	Urban	67.17	0.1581	0.0253	1.3788
	Sub-total	3789.64	29.3685	2.6367	70.0117
Aua	Undeveloped	1656.44	16.7853	1.1043	33.1288
	Agricultural	5.28	0.0311	0.0022	0.0844
	Residential	85.24	0.5123	0.4098	2.6638
	Urban	9.13	0.0215	0.0034	0.1874
	Sub-total	1756.09	17.3501	1.5197	36.0644

Table 1 (continued)
Existing conditions

BASIN	LAND USE TYPE	TSS Loading (STORM Model) (tons/yr)	Nitrogen (tons/yr)	Orthophosphate (tons/yr)	BOD5 (tons/yr)
Onesosopo	Undeveloped	760.71	7.7085	0.5071	15.2142
	Agricultural	464.36	2.7349	0.1900	7.4243
	Residential	77.65	0.4666	0.3733	2.4266
	Urban	0	0.0000	0.0000	0.0000
	Total	1302.72	10.9101	1.0705	25.0651
TOTALS	Undeveloped	14520.05	147.1365	9.6800	290.4010
	Agricultural	4611.88	27.1624	1.8872	73.7362
	Residential	2296.05	13.7984	11.0387	71.7516
	Urban	247.83	0.5834	0.0933	5.0873
	Total	21675.81	188.6807	22.6993	440.9760

Table 2A.
Pollution Accumulation Rates (Extracted from the S.T.O.R.M. manual)
By Land Use Classification (lb/acre/day)

Land Use	TSS	N	P	BOD5
Undeveloped	0.6250	0.0063	0.0004	0.0125
Agricultural	3.9100	0.0230	0.0016	0.0625
Residential	4.1600	0.0250	0.0200	0.1300
Urban	5.3100	0.0125	0.0020	0.1090

Table 2B
Pollution Accumulation Rates (Adjusted)
By Land Use Classification (lb/acre/day)

Land Use	Subjective Factor	TSS	N	P	BOD5
Undeveloped	1.20	0.7500	0.0076	0.0005	0.0150
Agricultural	1.75	6.8425	0.0403	0.0028	0.1094
Residential	2.50	10.4000	0.0625	0.0500	0.3250
Urban	2.00	10.6200	0.0250	0.0040	0.2180

Table 3
Existing conditions

Basin: Faga'alu

LAND USE TYPE	ACRES	TSS Loading (based on Table 2) (tons/yr)	TSS Loading (STORM model) (tons/yr)	Nitrogen Loading (based on Table 2) (tons/yr)	Nitrogen Loading (based on STORM model) (tons/yr)	Orthophosphate Loading (based on Table 2) (tons/yr)	Orthophosphate Loading (based on STORM model) (tons/yr)	BOD5 Loading (based on Table 2) (tons/yr)	BOD5 Loading (based on STORM model) (tons/yr)
Undeveloped	599.70	82.08	4425.31	0.8318	44.8431	0.0547	2.9502	1.6417	88.5062
Agricultural	16.20	20.23	53.14	0.1191	0.3130	0.0083	0.0217	0.3234	0.8496
Residential	61.20	116.16	297.13	0.6981	1.7856	0.5585	1.4285	3.6299	9.2853
Urban	26.00	50.39	28.87	0.1186	0.0680	0.0190	0.0109	1.0344	0.5926
Total	703.10	268.86	4804.45	1.7676	47.0097	0.6404	4.4113	6.6295	99.2338

Basin: Utulei

LAND USE TYPE	ACRES	TSS Loading (based on Table 2) (tons/yr)	TSS Loading (STORM model) (tons/yr)	Nitrogen Loading (based on Table 2) (tons/yr)	Nitrogen Loading (based on STORM model) (tons/yr)	Orthophosphate Loading (based on Table 2) (tons/yr)	Orthophosphate Loading (based on STORM model) (tons/yr)	BOD5 Loading (based on Table 2) (tons/yr)	BOD5 Loading (based on STORM model) (tons/yr)
Undeveloped	63.90	8.75	488.89	0.0886	4.9541	0.0058	0.3259	0.1749	9.7778
Agricultural	0.00	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Residential	74.00	140.45	751.12	0.8441	4.5139	0.6753	3.6112	4.3891	23.4725
Urban	42.10	81.60	66.78	0.1921	0.1572	0.0307	0.0252	1.6749	1.3708
Total	180.00	230.79	1306.79	1.1248	9.6252	0.7118	3.9622	6.2390	34.6211

Basin: Fagatogo

LAND USE TYPE	ACRES	TSS Loading (based on Table 2) (tons/yr)	TSS Loading (STORM model) (tons/yr)	Nitrogen Loading (based on Table 2) (tons/yr)	Nitrogen Loading (based on STORM model) (tons/yr)	Orthophosphate Loading (based on Table 2) (tons/yr)	Orthophosphate Loading (based on STORM model) (tons/yr)	BOD5 Loading (based on Table 2) (tons/yr)	BOD5 Loading (based on STORM model) (tons/yr)
Undeveloped	118.00	16.15	1254.28	0.1637	12.7100	0.0108	0.8362	0.3230	25.0856
Agricultural	0.00	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Residential	76.00	144.25	114.46	0.8669	0.6879	0.6935	0.5503	4.5078	3.5769
Urban	25.00	48.45	37.60	0.1141	0.0885	0.0183	0.0142	0.9946	0.7718
Total	219.00	208.85	1406.34	1.1446	13.4864	0.7225	1.4006	5.8254	29.4343

Table 3 (continued)
Existing conditions

Basin: Happy Valley

LAND USE TYPE	ACRES	TSS Loading (based on Table 2) (tons/yr)	TSS Loading (STORM model) (tons/yr)	Nitrogen Loading (based on Table 2) (tons/yr)	Nitrogen Loading (based on STORM model) (tons/yr)	Orthophosphate Loading (based on Table 2) (tons/yr)	Orthophosphate Loading (based on STORM model) (tons/yr)	BOD5 Loading (based on Table 2) (tons/yr)	BOD5 Loading (based on STORM model) (tons/yr)
Undeveloped	74.00	10.13	848.59	0.1026	8.5990	0.0068	0.5657	0.2026	16.9718
Agricultural	0.00	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Residential	35.00	66.43	56.86	0.3992	0.3417	0.3194	0.2734	2.0759	1.7769
Urban	10.00	19.38	16.25	0.0456	0.0383	0.0073	0.0061	0.3979	0.3336
Total	119.00	95.94	921.70	0.5475	8.9790	0.3334	0.8452	2.6764	19.0822

Basin: Pago Pago

LAND USE TYPE	ACRES	TSS Loading (based on Table 2) (tons/yr)	TSS Loading (STORM model) (tons/yr)	Nitrogen Loading (based on Table 2) (tons/yr)	Nitrogen Loading (based on STORM model) (tons/yr)	Orthophosphate Loading (based on Table 2) (tons/yr)	Orthophosphate Loading (based on STORM model) (tons/yr)	BOD5 Loading (based on Table 2) (tons/yr)	BOD5 Loading (based on STORM model) (tons/yr)
Undeveloped	563.00	77.06	3373.01	0.7809	34.1798	0.0514	2.2487	1.5412	67.4602
Agricultural	156.60	195.56	2226.59	1.1518	13.1139	0.0800	0.9111	3.1266	35.5994
Residential	154.80	293.81	766.45	1.7657	4.6061	1.4126	3.6849	9.1816	23.9516
Urban	20.60	39.93	22.03	0.0940	0.0519	0.0150	0.0083	0.8196	0.4522
Total	895.00	606.35	6388.08	3.7923	51.9516	1.5590	6.8530	14.6690	127.4634

Basin: Leloaloa

LAND USE TYPE	ACRES	TSS Loading (based on Table 2) (tons/yr)	TSS Loading (STORM model) (tons/yr)	Nitrogen Loading (based on Table 2) (tons/yr)	Nitrogen Loading (based on STORM model) (tons/yr)	Orthophosphate Loading (based on Table 2) (tons/yr)	Orthophosphate Loading (based on STORM model) (tons/yr)	BOD5 Loading (based on Table 2) (tons/yr)	BOD5 Loading (based on STORM model) (tons/yr)
Undeveloped	221.10	30.26	1712.82	0.3067	17.3566	0.0202	1.1419	0.6053	34.2564
Agricultural	136.70	170.70	1862.51	1.0054	10.9696	0.0699	0.7622	2.7293	29.7784
Residential	123.70	234.78	147.14	1.4110	0.8843	1.1288	0.7074	7.3370	4.5981
Urban	56.50	109.51	67.17	0.2578	0.1581	0.0412	0.0253	2.2479	1.3788
Total	538.00	545.26	3789.64	2.9808	29.3685	1.2600	2.6367	12.9194	70.0117

Table 3 (continued)
Existing conditions

Basin: Aua

LAND USE		TSS		Nitrogen		Orthophosphate		BOD5	
TYPE	ACRES	Loading (based on on Table 2) (tons/yr)	Loading (STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)
Undeveloped	320.40	43.85	1656.44	0.4444	16.7853	0.0292	1.1043	0.8771	33.1288
Agricultural	5.20	6.49	5.28	0.0382	0.0311	0.0027	0.0022	0.1038	0.0844
Residential	67.20	127.55	85.24	0.7665	0.5123	0.6132	0.4098	3.9858	2.6638
Urban	7.20	13.95	9.13	0.0329	0.0215	0.0053	0.0034	0.2865	0.1874
Total	400.00	191.85	1756.09	1.2820	17.3501	0.6503	1.5197	5.2532	36.0644

Basin: Onesosopo

LAND USE		TSS		Nitrogen		Orthophosphate		BOD5	
TYPE	ACRES	Loading (based on on Table 2) (tons/yr)	Loading (STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)
Undeveloped	186.90	25.58	760.71	0.2592	7.7085	0.0171	0.5071	0.5116	15.2142
Agricultural	21.10	26.35	464.36	0.1552	2.7349	0.0108	0.1900	0.4213	7.4243
Residential	56.00	106.29	77.65	0.6388	0.4666	0.5110	0.3733	3.3215	2.4266
Urban	0.00	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	264.00	158.22	1302.72	1.0532	10.9101	0.5388	1.0705	4.2544	25.0651

Table 4
Future conditions

BASIN	LAND USE TYPE	TSS Loading (STORM Model) (tons/yr)	Nitrogen (tons/yr)	Orthophosphate (tons/yr)	BOD5 (tons/yr)
Faga'alu	Undeveloped	4026.04	40.7972	2.6840	80.5208
	Agricultural	53.14	0.3130	0.0217	0.8496
	Residential	943.85	5.6722	4.5377	29.4953
	Urban	28.87	0.0680	0.0109	0.5926
	Sub-total	5051.90	46.8503	7.2544	111.4584
Utulei	Undeveloped	316.39	3.2061	0.2109	6.3278
	Agricultural	0.00	0.0000	0.0000	0.0000
	Residential	1761.80	10.5877	8.4702	55.0563
	Urban	66.78	0.1572	0.0252	1.3708
	Sub-total	2144.97	13.9510	8.7063	62.7549
Fagatogo	Undeveloped	1056.33	10.7041	0.7042	21.1266
	Agricultural	0.00	0.0000	0.0000	0.0000
	Residential	1210.41	7.2741	5.8193	37.8253
	Urban	37.60	0.0885	0.0142	0.7718
	Sub-total	2304.34	18.0668	6.5377	59.7237
Happy Valley	Undeveloped	757.18	7.6728	0.5048	15.1436
	Agricultural	0.00	0.0000	0.0000	0.0000
	Residential	462.79	2.7812	2.2250	14.4622
	Urban	16.25	0.0383	0.0061	0.3336
	Sub-total	1236.22	10.4922	2.7359	29.9394
Pago Pago	Undeveloped	3492.32	35.3888	2.3282	69.8464
	Agricultural	1394.85	8.2152	0.5708	22.3013
	Residential	1869.05	11.2323	8.9858	58.4078
	Urban	22.03	0.0519	0.0083	0.4522
	Sub-total	6778.25	54.8882	11.8931	151.0077
Leloaloa	Undeveloped	1712.82	17.3566	1.1419	34.2564
	Agricultural	1930.75	11.3715	0.7901	30.8694
	Residential	384.22	2.3090	1.8472	12.0069
	Urban	87.01	0.2048	0.0328	1.7861
	Sub-total	4114.80	31.2419	3.8119	78.9188
Aua	Undeveloped	1656.44	16.7853	1.1043	33.1288
	Agricultural	0.00	0.0000	0.0000	0.0000
	Residential	91.83	0.5519	0.4415	2.8697
	Urban	9.13	0.0215	0.0034	0.1874
	Sub-total	1757.40	17.3586	1.5492	36.1859

Table 4 (continued)
Future conditions

BASIN	LAND USE TYPE	TSS Loading (STORM Model) (tons/yr)	Nitrogen (tons/yr)	Orthophosphate (tons/yr)	BOD5 (tons/yr)
Onesosopo	Undeveloped	760.71	7.7085	0.5071	15.2142
	Agricultural	464.36	2.7349	0.1900	7.4243
	Residential	77.65	0.4666	0.3733	2.4266
	Urban	0	0.0000	0.0000	0.0000
	Total	1302.72	10.9101	1.0705	25.0651
TOTALS	Undeveloped	13778.23	139.6194	9.1855	275.5646
	Agricultural	3843.10	22.6346	1.5726	61.4447
	Residential	6801.60	40.8750	32.7000	212.5500
	Urban	267.67	0.6301	0.1008	5.4945
	Total	24690.60	203.7591	43.5589	555.0538

Table 5
Future conditions

Basin: Faga'alu

LAND USE TYPE	ACRES	TSS Loading (based on Table 2) (tons/yr)	TSS Loading (STORM model) (tons/yr)	Nitrogen Loading (based on Table 2) (tons/yr)	Nitrogen Loading (based on STORM model) (tons/yr)	Orthophosphate Loading (based on Table 2) (tons/yr)	Orthophosphate Loading (based on STORM model) (tons/yr)	BOD5 Loading (based on Table 2) (tons/yr)	BOD5 Loading (based on STORM model) (tons/yr)
Undeveloped	551.20	75.45	4026.04	0.7645	40.7972	0.0503	2.6840	1.5089	80.5208
Agricultural	16.20	20.23	53.14	0.1191	0.3130	0.0083	0.0217	0.3234	0.8496
Residential	109.70	208.21	943.85	1.2513	5.6722	1.0010	4.5377	6.5066	29.4953
Urban	26.00	50.39	28.87	0.1186	0.0680	0.0190	0.0109	1.0344	0.5926
Total	703.10	354.28	5051.90	2.2536	46.8503	1.0786	7.2544	9.3733	111.4584

Basin: Utulei

LAND USE TYPE	ACRES	TSS Loading (based on Table 2) (tons/yr)	TSS Loading (STORM model) (tons/yr)	Nitrogen Loading (based on Table 2) (tons/yr)	Nitrogen Loading (based on STORM model) (tons/yr)	Orthophosphate Loading (based on Table 2) (tons/yr)	Orthophosphate Loading (based on STORM model) (tons/yr)	BOD5 Loading (based on Table 2) (tons/yr)	BOD5 Loading (based on STORM model) (tons/yr)
Undeveloped	41.90	5.74	316.39	0.0581	3.2061	0.0038	0.2109	0.1147	6.3278
Agricultural	0.00	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Residential	95.90	182.02	1761.80	1.0939	10.5877	0.8751	8.4702	5.6881	55.0563
Urban	42.10	81.60	66.78	0.1921	0.1572	0.0307	0.0252	1.6749	1.3708
Total	179.90	269.35	2144.97	1.3441	13.9510	0.9096	8.7063	7.4777	62.7549

Basin: Fagatogo

LAND USE TYPE	ACRES	TSS Loading (based on Table 2) (tons/yr)	TSS Loading (STORM model) (tons/yr)	Nitrogen Loading (based on Table 2) (tons/yr)	Nitrogen Loading (based on STORM model) (tons/yr)	Orthophosphate Loading (based on Table 2) (tons/yr)	Orthophosphate Loading (based on STORM model) (tons/yr)	BOD5 Loading (based on Table 2) (tons/yr)	BOD5 Loading (based on STORM model) (tons/yr)
Undeveloped	109.90	15.04	1056.33	0.1524	10.7041	0.0100	0.7042	0.3009	21.1266
Agricultural	0.00	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Residential	84.10	159.62	1210.41	0.9593	7.2741	0.7674	5.8193	4.9882	37.8253
Urban	25.00	48.45	37.60	0.1141	0.0885	0.0183	0.0142	0.9946	0.7718
Total	219.00	223.12	2304.34	1.2258	18.0668	0.7957	6.5377	6.2837	59.7237

Table 5 (continued)
Future conditions

Basin: Happy Valley

LAND USE		TSS		Nitrogen		Orthophosphate		BOD5	
TYPE	ACRES	Loading (based on on Table 2) (tons/yr)	Loading (STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)
Undeveloped	66.00	9.03	757.18	0.0915	7.6728	0.0060	0.5048	0.1807	15.1436
Agricultural	0.00	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Residential	43.00	81.61	462.79	0.4905	2.7812	0.3924	2.2250	2.5504	14.4622
Urban	10.00	19.38	16.25	0.0456	0.0383	0.0073	0.0061	0.3979	0.3336
Total	119.00	110.03	1236.22	0.6276	10.4922	0.4057	2.7359	3.1290	29.9394

Basin: Pago Pago

LAND USE		TSS		Nitrogen		Orthophosphate		BOD5	
TYPE	ACRES	Loading (based on on Table 2) (tons/yr)	Loading (STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)
Undeveloped	533.40	73.01	3492.32	0.7398	35.3888	0.0487	2.3282	1.4602	69.8464
Agricultural	112.80	140.86	1394.85	0.8296	8.2152	0.0576	0.5708	2.2521	22.3013
Residential	228.20	433.12	1869.05	2.6029	11.2323	2.0823	8.9858	13.5351	58.4078
Urban	20.60	39.93	22.03	0.0940	0.0519	0.0150	0.0083	0.8196	0.4522
Total	895.00	686.92	6778.25	4.2663	54.8882	2.2037	11.8931	18.0670	151.0077

Basin: Leloaloa

LAND USE		TSS		Nitrogen		Orthophosphate		BOD5	
TYPE	ACRES	Loading (based on on Table 2) (tons/yr)	Loading (STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)
Undeveloped	221.10	30.26	1712.82	0.3067	17.3566	0.0202	1.1419	0.6053	34.2564
Agricultural	123.70	154.47	1930.75	0.9098	11.3715	0.0632	0.7901	2.4697	30.8694
Residential	120.00	227.76	384.22	1.3688	2.3090	1.0950	1.8472	7.1175	12.0069
Urban	73.20	141.87	87.01	0.3340	0.2048	0.0534	0.0328	2.9123	1.7861
Total	538.00	554.37	4114.80	2.9192	31.2419	1.2318	3.8119	13.1048	78.9188

Table 5 (continued)
Future conditions

Basin: Aua

LAND USE		TSS		Nitrogen		Orthophosphate		BOD5	
TYPE	ACRES	Loading (based on on Table 2) (tons/yr)	Loading (STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)
Undeveloped	320.40	43.85	1656.44	0.4444	16.7853	0.0292	1.1043	0.8771	33.1288
Agricultural	0.00	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Residential	72.40	137.42	91.83	0.8258	0.5519	0.6607	0.4415	4.2942	2.8697
Urban	7.20	13.95	9.13	0.0329	0.0215	0.0053	0.0034	0.2865	0.1874
Total	400.00	195.22	1757.40	1.3031	17.3586	0.6951	1.5492	5.4578	36.1859

Basin: Onesosopo

LAND USE		TSS		Nitrogen		Orthophosphate		BOD5	
TYPE	ACRES	Loading (based on on Table 2) (tons/yr)	Loading (STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)	Loading (based on on Table 2) (tons/yr)	Loading (based on STORM model) (tons/yr)
Undeveloped	186.90	25.58	760.71	0.2592	7.7085	0.0171	0.5071	0.5116	15.2142
Agricultural	21.10	26.35	464.36	0.1552	2.7349	0.0108	0.1900	0.4213	7.4243
Residential	56.00	106.29	77.65	0.6388	0.4666	0.5110	0.3733	3.3215	2.4266
Urban	0.00	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	264.00	158.22	1302.72	1.0532	10.9101	0.5388	1.0705	4.2544	25.0651

APPENDIX D
BEST MANAGEMENT PRACTICE ALTERNATIVES
DEFINITIONS

ACCESS ROAD

Definition

A road constructed as a part of a conservation plan to provide needed access.

Scope

This standard applies to roads constructed to provide access to farms, ranches, fields, conservation systems, structures, and recreation areas.

Purpose

To provide a route for travel, for moving equipment and supplies, and for providing access for proper operation and management of conservation enterprises.

Where Applicable

Where roads are needed to provide access from a private road, county or state highway to the conservation enterprises, or to provide travelways within the planned area.

Cost

$3-$6 per foot

BRUSH MANAGEMENT

Definition

Management and manipulation of stands of brush by mechanical, chemical, or biological means, or by controlled burning on rangeland, native pasture, pastureland, recreation land, and wildlife land. (Includes reducing excess brush to restore natural plant community balance and manipulating brush stands through selective and patterned control methods to meet specific needs of the land and objectives of the land user.)

Purpose

To improve or restore a quality plant cover to (1) reduce sediment and improve watershed quality; (2) increase quality and production of desirable plants for livestock and wildlife; (3) maintain or increase wildlife habitat values; (4) enhance esthetic and recreation qualities; (5) maintain open land; and (6) protect life and property.

Where Applicable

(1) On brush infested land with the potential to produce desirable native or adapted forage plants; (2) where adjustments in grazing management alone will not restore the kind of plant cover needed to attain the conservation objectives within a reasonable time; (3) where brush management will improve wildlife, recreation or natural beauty; (4) where control of woody phreatophytes is necessary to conserve moisture; or (5) where reduction of brush is necessary to the safety of life and property in areas of high wildfire hazard.

Cost
$40-$80 per acre

CHISELING AND SUBSOILING

Definition

Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.

Purpose

To improve water and root penetration and aeration.

Where Applicable

On suitable soils, chiseling is applicable if restrictive soil layers are less than 16 inches deep. On suitable soils, subsoiling is applicable if restrictive soil layers are more than 16 inches deep.

Cost
$40-$60 per acre

CONSERVATION CROPPING SYSTEM

Definition

Growing crops in combination with needed cultural and management measures. Cropping systems include rotations that contain grasses and legumes as well as rotations in which the desired benefits are achieved without the use of such crops.

Purpose

To improve or maintain good physical condition of the soil; protect the soil during periods when erosion usually occurs; help control weeds, insects, and diseases; and meet the needs and desires of farmers for an economic return.

Where Applicable

On all cropland and on certain recreation and wildlife land.

CONTOUR FARMING

Definition

Farming sloping cultivated land in such a way that plowing, preparing land, planting, and cultivating are done on the contour. (Includes following established grades of terraces or diversions.)

Purpose

To reduce erosion and control water.

Where Applicable

On sloping cropland and on recreation and wildlife land where other cultural and management practices in a cropping system do not control soil and water loss.

Cost
$8-$12 per acre

CONTOURING ORCHARD AND OTHER FRUIT AREAS

Definition

Planting orchards, vineyards, or small fruits so that all cultural operations can be done on the contour.

Purpose

To reduce soil and water loss; to better control and use water; and to be able to operate farm equipment more easily.

Where Applicable

On sloping land where soil and water loss needs to be controlled, especially where permanent cover is not established.

Cost

$8-$12 per acre

COVER AND GREEN MANURE CROP

Definition

A crop of close-growing grasses, legumes, or small grain used primarily for seasonal protection and soil improvement. It usually is grown for one year or less, except where there is permanent cover as in orchards.

Purpose

To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.

Where Applicable

On cropland; certain recreation and wildlife land; and orchard, vineyard, and small fruit areas.

Cost
$75-$100 per acre

CRITICAL AREA PLANTING

Definition

Planting vegetation such as trees, shrubs, vines, grasses or legumes on critical areas. (Does not include tree planting mainly for wood products.)

Purpose

To stabilize the soil; reduce damage from sediment and runoff to downstream areas; improve wildlife habitat; and enhance natural beauty.

Where Applicable

On sediment-producing, highly erodible or severely eroded areas, such as dams, dike, mine spoil, levees, cuts, fills, surface mined areas, and denuded or gullied areas where vegetation is difficult to establish with usual seeding or planting methods.

Cost
$175-$600 per acre

CROP RESIDUE MANAGEMENT

Definition

Using plant residues to protect cultivated fields during critical erosion periods.

Purpose

To conserve moisture; increase infiltration; reduce soil loss; and improve soil tilth.

Where Applicable

On land where adequate crop residues are produced.

Cost
$8-$10 per acre

CROSS SLOPE BLOCK LAYOUT

Definition

Managing farming operations in such a way that plowing, land preparation and planting are done in predetermined width blocks across general land slope.

Purpose

To reduce erosion and provide control of runoff water.

Where Applicable

On all caneland or pineapple land with slopes between 3 to 20 percent and on complex sloping lands where contour farming or diversions are not feasible or practical.

Cost
$5-$10 per acre

DAM, DIVERSION

Definition

A structure built to divert part or all of the water from a waterway or stream into a different watercourse, an irrigation canal or ditch, or a waterspreading system.

Scope

This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. (Does not include Diversion, Floodwater Diversion, Floodwater Retarding Structure, or Grade Stabilization Structure.)

Purpose

The purpose of a diversion dam is (1) to divert part or all of the water from a waterway in such a manner that it can be controlled and applied to a beneficial use, or (2) to divert periodic damaging flows from a watercourse to another watercourse having characteristics which reduce the damage potential of the flows.

Cost

$500-$5000 each

DAM, MULTI-PURPOSE

Definition

A dam, constructed across a stream or natural water course, with designed reservoir storage capacity specifically provided for two or more purposes such as floodwater retardation and irrigation water supply, municipal water supply, recreation, etc.

Scope

This standard applies to dams which have separate storage allocations for two or more of the purposes listed below. (Sediment storage is not considered a separate purpose.)

Purpose

A multiple-purpose dam must provide distinct and specific storage allocations for two or more of the following purposes: (1) floodwater retardation, (2) irrigation, (3) fishing, hunting, boating, swimming or other recreational use, (4) (4) improved environment or habitat for fish or wildlife, (5) municipal, (6) industrial, and (7) other uses.

Where Applicable

This practice applies only to sites meeting all criteria:

1. Topographic, geologic, hydrologic and soil conditions at the proposed site are satisfactory for the development of a feasible dam and reservoir.

2. The sediment yield from the watershed is not excessive.

3. Water is available from a single or combined source of surface runoff, base flow, or from subsurface storage in sufficient quantity and adequate quality to satisfy the intended purposes.

Cost

$500-$10,000 each

DEBRIS BASIN

Definition

A barrier or dam constructed across a waterway or at other suitable locations to form a silt or sediment basin.

Purpose

To preserve the capacity of reservoirs, ditches, canals, diversions, waterways, and stream; to prevent undesirable deposition on bottom lands and developed areas; to trap sediment originating from construction sites; and to reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.

Where Applicable

This practice applies where physical conditions or landownership preclude the treatment of the sediment source by the installation of erosion control measures to keep soil and other material in place, or a debris basin offers the most practical solution to the problem.

Cost
\$500-\$1500 each

DEFERRED GRAZING

Definition

Postponing grazing or resting grazing land for a prescribed period.

Purpose

To (1) promote natural revegetation by increasing the vigor of the forage stand and permitting desirable plants to produce seed; (2) provide a feed reserve for fall and winter grazing or emergency use; (3) to improve the appearance of range with inadequate cover; and (4) to improve hydrologic conditions and reduce soil loss.

DIKE

Definition

An embankment constructed of earth or other suitable materials to protect land against overflow from streams, lakes and tidal influences; flat land areas from diffused surface waters; and to provide or improve wetland habitat for wildlife.

Scope

This standard covers quality requirements for planning, designing, and constructing dikes to provide protection for land and property and includes dikes for floodways and wildlife improvement.

Dikes are divided into the following three classes:

> Class I dikes are used to protect improved lands where inundation, erosion and scour, or sediment and debris may cause high property damage or loss of life.
>
> Class II dikes include embankments built to protect agricultural lands of medium to high capability with improvements generally limited to farmsteads and allied farm facilities.
>
> Class III dikes are embankments which protect agricultural lands of relatively low capability or improvements of low values. These dikes are limited to low heads of water.

Purpose

The purposes of dikes are to permit the improvement of land for agricultural production by preventing overflow and better utilizing drainage facilities, to prevent damage to land and property, and to facilitate water storage and control in connection with wildlife and other developments. Dikes can also be used to protect natural areas, scenic features, and archeological sites from damage.

Where Applicable

The land to be protected must be suitable for the intended use. Locations shall be such that practical and economical construction, accessibility and maintenance can be obtained. Property lines, soils, open water, watershed characteristics, runoff, and adequate outlets for either gravity or pump drainage must be favorable.

Cost

$5-$50 per foot

DIVERSION

Definition

A channel with a supporting ridge on the lower side constructed across the slope.

Purpose

The purpose of this practice is to divert water from areas where it is in excess to sites where it can be used or disposed of safely.

Where Applicable

This practice applies to sites where:

1. Runoff from higher lying areas is damaging cropland, pastureland, farmsteads, or conservation practices such as terraces or stripcropping.

2. Surface and shallow subsurface flow is damaging sloping upland.

3. Runoff is available for diversion and use on nearby sites.

4. Required as a part of a pollution abatement system, or to control erosion and runoff on urban or developing areas and construction sites.

Diversions are not usually applicable below high sediment producing areas unless land treatment practices or structural measures, designed to prevent damaging accumulations of sediment in the channels, are installed with or before the diversions.

Cost

\$.50-\$1 per foot

EMERGENCY TILLAGE

Definition

Roughening the soil surface by such methods as listing, ridging, duckfooting, or chiseling. (This practice is considered an emergency conservation measure and does not provide long-term benefits.)

Purpose

To temporarily protect cultivated land against soil loss primarily due to wind during critical erosion periods.

Where Applicable

On cropland that is in immediate danger of being eroded by wind because of insufficient residues, cloddiness, or roughness; or where other practices fail to control erosion.

Cost

$20-$40 per acre

FENCING

Definition

Enclosing or dividing an area of land with a suitable permanent structure that acts as a barrier to livestock, big game, or people. (Does not include electric or other temporary fences.)

Purpose

To (1) exclude livestock or big game from areas that should be protected from grazing; (2) confine livestock or big game in an area, or prevent trespassing; (3) subdivide land to permit use of grazing systems including, when pertinent, design of fence to permit free movement of game species; (4) protect new seedings and plantings from grazing; and (5) regulate access to areas by people.

Cost
$1-$2 per foot

FIELD WINDBREAK

Definition

A strip or belt of trees or shrubs established within or adjacent to a field.

Purpose

To reduce soil blowing; conserve moisture; protect crops, orchards, livestock, and wildlife; or increase the natural beauty of an area.

Where Applicable

In or around open fields which need protection against wind damage to soils, crops, or livestock.

Cost
$.25-$2 per foot

GRADE STABILIZATION STRUCTURE

Definition

A structure to stabilize the grade or to control head cutting in natural or artificial channels. (Does not include structures used in drainage and irrigation systems primarily for water control.)

Scope

This standard applies to all types of grade stabilization structures.

Purpose

Grade stabilization structures are installed to stabilize the grade and control erosion in natural or artificial channels, prevent the formation or advance of gullies, and reduce environmental and pollution hazards.

Where Applicable

These structures apply where the concentration and flow velocity of water are such that structures are required to stabilize the grade in channels or to control gully erosion. Special attention will be given to maintaining or improving habitat for fish and wildlife, where applicable.

Cost
$500-$5000 each

GRASSED WATERWAY OR OUTLET

Definition

A natural or constructed waterway or outlet shaped or graded and established in vegetation suitable to safely dispose of runoff from a field, diversion, terrace, or other structure.

Purpose

To prevent excessive soil loss and formation of gullies.

Where Applicable

Where concentrated runoff must be disposed of at safe velocities.

Cost
$300-$600 per acre

GRAZING LAND MECHANICAL TREATMENT

Definition

Renovating, contour furrowing, pitting, or chiseling native grazing land by mechanical means.

Purpose

To improve plant cover quickly by reducing competition of undesirable plants, aerating the soil, retarding runoff and increasing available moisture, reducing erosion, and protecting lower lying land or structures from siltation.

Where Applicable

(1) On grazing land where perennial plants should be increased; (2) where soil and slope are suitable to each method and type of equipment used; (3) where grazing will be managed to allow plants to respond to this treatment.

Cost
$40-$60 per acre

HEAVY USE AREA PROTECTION

Definition

Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.

Purpose

This practice is used to stabilize urban, recreation or essential facility areas subjected to sustained heavy use by people, animals, or vehicles.

Where Applicable

On urban and recreation or other areas subjected to sustained heavy use that require special treatment to protect the area from erosion or other environmental deterioration.

Cost

\$.50-\$2 per square foot

HILLSIDE DITCH

Definition

A channel with supporting ridge on the lower side constructed across the slope at definite vertical intervals and gradient, with or without vegetative barrier, to detain or control the flow of water to a protected outlet to check erosion on sloping land.

Scope

Covers the planning and design of hillside ditches on steep land and does not apply to diversions or terraces.

Purpose

Hillside ditches are constructed to divert runoff water to a protected outlet, and reduce slope lengths thus minimizing erosion and runoff.

Where Applicable

Hillside ditches are applicable to tropical lands determined to be suitable for cultivation with sufficient depth for construction.

Cost

$.25-$.50 per foot

IRRIGATION SYSTEM

Definition

A planned irrigation system where all necessary water control structures have been installed for the efficient distribution and application of irrigation water.

Scope

This standard covers the planning and design of the overall irrigation water distribution and waste water disposal system for a farm or farming unit.

Purpose

Irrigation systems are installed to efficiently convey and distribute irrigation water to the point of application without excessive erosion, water losses, or reduction in water quality.

Where Applicable

Irrigation systems shall be planned and installed to serve lands that are suitable for use as irrigated land with the quality of water available. Water supplies must be sufficient in quantity and quality to make irrigation practical for the crops to be grown and also must be adequate for the water application methods to be used.

Each irrigation system shall be designed as an integral part of an overall plan of conservation land use and treatment for the farm that is based on the capabilities of the land and the needs of the farm enterprise.

Cost
$250-$800 per acre

IRRIGATION WATER MANAGEMENT

Definition

Determining and controlling the rate, amount and timing of irrigation water application to soils to supply plant water needs in a planned and efficient manner.

Purpose

To effectively utilize the available irrigation water supply in managing and controlling the moisture environment of crops to promote the desired crop response; to minimize soil erosion and loss of plant nutrients; to control undesirable water loss; and to protect water quality.

Where Applicable

This practice is adapted to all lands that are suitable for irrigation and that have a water supply of suitable quality and quantity.

LAND SMOOTHING

Definition

Removing irregularities on the land surface by use of special equipment. Ordinarily this does not require a complete grid survey. Includes operations classed as rough grading. (Does not include the "floating" done as a regular maintenance practice on irrigated land or the "planning" done as the final step in Irrigation Land Leveling or Drainage Land Grading.)

Purpose

(1) To improve surface drainage; (2) to provide for more effective use of precipitation; (3) to obtain uniform planting depths; (4) to provide for more uniform cultivation; (5) to improve equipment operation and efficiency; (6) to improve terrace alignment; and (7) to facilitate coutour cultivation.

Where Applicable

This practice applies on lands where depressions, mounds, old terraces, turn rows, and other surface irregularities interfere with the application of needed soil and water conservation and management practices. It is limited to areas having adequate soil depths.

Cost

$50-$500 per acre

LINED WATERWAY OR OUTLET

Definition

A waterway or outlet with an erosion resistant lining of concrete, stone, or other permanent material. The lined section extends up the side slopes to designed depth. The earth above the permanent lining may be vegetated or otherwise protected.

Scope

This standard applies to waterways or outlets with lining of non-reinforced, cast-in-place concrete; flagstone mortared in place; rock riprap or similar permanent linings.

Purpose

Waterways or outlets are lined to provide for safe disposal of runoff from other conservation structures or from natural concentrations of flow, without damage by erosion or flooding, in situations where unlined or grassed waterways would be inadequate. Properly designed linings may also control seepage, piping, and sloughing or slides.

Cost
$10 per foot

LIVESTOCK EXCLUSION

Definition

Excluding livestock from an area where grazing is not wanted.

Purpose

To protect, maintain, or improve the quantity and quality of the plant and animal resources; to maintain enough cover to protect the soil; to maintain moisture resources; and to increase natural beauty.

Where Applicable

Where desired forest reproduction, soil hydrologic values, existing vegetation (including trees), or other things, such as aesthetic values or recreation, are prevented from damage by livestock. This practice is applicable only if an owner or operator physically constructs or maintains the barrier (fence, etc.) necessary to exclude livestock. It is not applicable on areas where livestock are not present or are usually confined to fenced areas such as pastures or feedlots.

Cost
$1 per foot of fencing

MINIMUM TILLAGE

Definition

Limiting the number of cultural operations to those that are properly timed and essential to produce a crop and prevent soil damage.

Purpose

To retard deterioration of soil structure; reduce soil compaction and formation of tillage pans; and to improve soil aeration, permeability, and tilth.

Where Applicable

On all cropland and on certain recreation and wildlife land.

Cost
$10 per acre

MULCHING

Definition

Applying plant residues or other suitable materials not produced on the site to the soil surface.

Purpose

To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeks; and help establish plant cover.

Where Applicable

On soils subject to erosion on which low-residue-producing crops such as grapes and small fruits are grown; on critical areas; and on soils that have a low infiltration rate.

Cost
$200 per acre

PASTURE AND HAYLAND MANAGEMENT

Definition

Proper treatment and use of pastureland or hayland.

Purpose

To prolong life of desirable forage species; to maintain or improve the quality and quantity of forage; and to protect the soil and reduce water loss.

Where Applicable

On all pastureland or hayland.

Cost
$50 per acre

PASTURE AND HAYLAND PLANTING

Definition

Establishing and re-establishing long-term stands of adapted species of perennial, biennial, or reseeding forage plants. (Includes Pasture and Hayland Renovation. Does not include Grassed Waterway or Outlet on cropland.)

Purpose

To reduce erosion, to produce high-quality forage, and to adjust land use.

Where Applicable

On existing pasture and hayland or on land that is converted from other uses.

Cost
$150-$200 per acre

PIPELINE

Definition

Pipeline installed for the conveyance of water for livestock or recreational use.

Scope

This standard covers pipelines of less than 4 inches inside diameter installed for livestock watering or for use in recreational areas.

Purpose

To convey water from source of supply to points of use.

Where Applicable

Where conveyance of water in a closed conduit is desirable or necessary to conduct water from one point to another, to conserve the supply, or for reasons of sanitation.

Cost

$.75 - $3.00 per foot

PLANNED GRAZING SYSTEMS

Definition

A system in which two or more grazing units are alternately rested from grazing in a planned sequence over a period of years, and the rest period may be through out the year or during the growing season of the key plants.

Purpose

(1) To maintain or speed up improvement in plant cover while properly using the forage on all grazing units; (2) to improve efficiency of grazing by uniformly using all parts of each grazing units; (3) to insure a supply of forage throughout the grazing season; (4) for watershed protection; and (5) to enhance wildlife habitat.

Where Applicable

On all rangeland, native pasture, grazable woodland, and grazed wildlife land.

POND

Definition

A water impoundment made by constructing a dam or embankment, or by excavating a pit or "dugout."

Ponds constructed by the first of these methods are referred to as "Embankment Ponds" and those constructed by the latter method as "Excavated Ponds." Ponds resulting from both excavation and embankment are classified as "Embankment Ponds" where the depth of water impounded against the embankment at spillway elevation is 3 feet or more.

Purpose

Ponds are constructed to provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard spraying, and other related uses.

Cost
$1,000-$50,000 each

PROPER GRAZING USE

Definition

Grazing at an intensity which will maintain enough cover to protect the soil and maintain or improve the quantity and quality of desirable vegetation.

Purpose

(1) Increase the vigor and reproduction of key plants; (2) accumulate litter and mulch necessary to conserve soil and water; (3) improve or maintain condition of the vegetation; (4) increase forage production; (5) maintain natural beauty; and (6) reduce the fire hazard on forestland.

Where Applicable

On all rangeland, native pasture, grazable woodland, and grazed wildlife land.

Cost
$5-$10 per acre

STOCK TRAILS AND WALKWAYS

Definition

A livestock trail or walkway constructed to improve grazing distribution and access to forage and water.

Purpose

To (1) provide or improve access to forage and water; (2) reduce livestock concentrations; (3) control livestock to permit proper grazing use and planned grazing systems; and (4) improve grazing efficiency.

Where Applicable

On grazing areas where free livestock movement is hampered, such as on steep mountain slopes, across rock outcrops, through dense timber, over rough lava beds, and on marsh range or grazing areas subject to overflow.

Cost

$300 per foot

STREAMBANK PROTECTION

Definition

Stabilizing and protecting banks of streams, lakes, estuaries or excavated channels against scour and erosion by vegetative or structural means.

Scope

This standard covers the measures used to stabilize and protect the banks of streams, lakes, estuaries, and excavated channels. It is not applicable to erosion problems on main ocean fronts and similar areas of complexity not normally within the scope of SCS authority or expertise.

Purpose

Streambank protection is established to stabilize or protect for one or more of the following purposes: (1) to prevent erosion, loss of land, or damage to utilities, roads, buildings, or other facilities adjacent to the eroding area; (2) to maintain the capacity of a channel; (3) to control channel meander which would adversely affect downstream facilities; (4) to reduce sediment loads causing damage and pollution or to improve areas for recreational use or as a habitat for fish and wildlife.

Cost

$1-$3 per foot

STREAM CHANNEL STABILIZATION

Definition

Stabilizing the channel of a stream with suitable structures.

Scope

This standard covers the structural work done to control aggradation or degradation in a stream channel. (Does not include work done to prevent bank cutting or meander.)

Where Applicable

This practice applies to stream channels undergoing damaging aggradation or degradation that cannot be feasibly controlled by clearing or snagging.

Cost
$5-$10 per foot

STRUCTURE FOR WATER CONTROL

Definition

A structure in an irrigation, drainage, or other water management system that conveys water, controls the direction or rate of flow, or maintains a desired water surface elevation. These structures are also for the protection of fish and wildlife and other environmental values, as well as for protection and management of soils and plants. (Does not include structures for which the primary purpose is to control head cutting and erosion,)

Scope

This standard applies to the structures normally installed for the conveyance, flow control, or level regulation of water. It covers the planning and functional design of such water control structures, but not the detailed design criteria or construction specifications for specific structures. (Does not include structural components of irrigation pipelines or subsurface drains.)

Purpose

Water control structures are installed to control the stage, discharge, distribution, delivery or direction of flow of water in open channels, or water use areas. They may also be used for water quality control such as sediment reduction or temperature regulation.

Cost
$100-$15,000 each

TERRACE

Definition

An earth embankment, channel, or a combination ridge and channel constructed across the slope.

Scope

This standard covers the planning and design of all types of terraces. (Does not apply to diversions.)

Purpose

Terraces are constructed to (1) reduce slope length, (2) reduce erosion, (3) reduce sediment content in runoff water, (4) intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, (5) retain runoff for moisture conservation, (6) prevent gully development, (7) reform the land surface, (8) improve farmability, and (9) reduce flooding.

Where Applicable

This practice applies where (1) erosion is a problem, 2) there is a need to conserve water, (3) the soils and topography are such that terraces can be constructed and farmed with a reasonable effort, (4) a suitable outlet can be provided, and (5) where runoff and sediment damages land or improvements downstream or impairs water quality.

Cost
$.50-$1 per foot

TREE PLANTING

Definition

Planting tree seedlings or cuttings.

Purpose

To establish or reinforce a stand of trees to conserve soil and moisture; beautify an area; protect a watershed; or produce wood crops.

Where Applicable

In open fields, in understocked woodland, beneath less desirable tree species, or in other areas suitable for producing wood crops; where erosion control or watershed protection is needed; where greater natural beauty is wanted; or where a combination of these is desired.

Cost
$50-$100 per acre

TROUGH OR TANK

Definition

A trough or tank with needed devices for water control and waste water disposal installed to provide drinking water for livestock.

Scope

This standard covers all trough or tank installations to provide livestock watering facilities supplied from a spring, reservoir, well, or other source.

Purpose

To provide watering facilities at selected locations which will bring about the desired protection of vegetative cover through proper distribution of grazing or better grassland management.

Where Applicable

This practice applies where there is a need for new or improved watering places to permit the desired level of grassland management and reduce health hazards to livestock.

Cost

$50-$2,500 each

WASTE MANAGEMENT SYSTEM

Definition

A planned system to manage liquid and solid waste, including runoff from concentrated waste areas, with ultimate disposal in a manner which does not degrade air, soil, or water resources.

Scope

This standard establishes the minimum acceptable quality for the planning and operation of waste management systems. (Does not apply to design and installation, as these are covered under practice standards for the components.)

Purpose

Waste management systems are used to manage waste in rural areas in a manner which prevents or minimizes degradation of air, soil, and water resources and protects public health and safety. Such systems are planned to preclude discharge of pollutants to surface or ground water and, to the fullest practicable extent, recycle waste through soil and plants.

Where Applicable

This practice applies where (1) waste is generated by agricultural production or processing; (2) waste from municipal and industrial treatment plants is utilized in agricultural production; (3) all practice components necessary to make a complete system are specified; and (4) soil, water and plant resources are adequate to properly manage the waste.

Cost

$5,000-$25,000 each

WOODLAND SITE PREPARATION

Definition

Treating areas to encourage natural seeding of desirable trees or to permit reforestation by planting or direct seeding.

Purpose

To prepare land for establishing a stand of trees to conserve soil and water improve watersheds, or to produce wood crops.

Where Applicable

On understocked areas or areas growing undesired vegetation (brush etc.) on which wood crops can be grown.

Cost

$50-$500 per acre